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ABSTRACT

Designed for both the home economics teacher as a reference in planning a science unit in the child care curriculum, and for the student of child care as a resource for planning science activities, this handbook contains six units for teaching science to preschool children. Five of the units teach through imaginative finger plays and songs, and all contain learning activities to help children explore their world through touching, tasting, observing, and investigating. Some activities provide practice in classroom skills, while others encourage creativity by the students. Topics covered include: Understanding the Body, Seasons/Weather, Animals, Plant Power, Machines and Tools, and Force and Pressure. Visuals for bulletin board or projector occur throughout the units. Appendixes contain suggested science resources including records, pictures, films and filmstrips, and children's science books; a plan for a discovery center: a list of free or inexpensive science materials: suggestions for teaching science activities: a blank activity plan form: and an instructor checklist for a science presentation. A bibliography is also included. (KC)

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AN ACTIVITIES HANDBOOK FOR CHILD CARE:

SCIENCE

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PREFACE

What shall we teach in science? Where can I find a list of science activities my students can use in planning for children? What are appropriate science concepts for preschoolers? But, preschoolers cannot understand science concepts! These statements were the stimuli for the development of ***An Activities Handbook for Child Care: Science.***

There is a demand for science materials to be used in the home economics child care curriculum. However, many teachers feel untrained and inadequate in teaching science. To an adult, science may imply complicated experiments. For a child, science may mean simply an opportunity to handle, investigate, taste, feel or observe. It means a chance to explore his world.

This handbook is directed to both the *teacher* and the *student* of child care. The teacher may find it helpful as a reference for planning a science unit in the child care curriculum. The student may use the handbook as a resource for planning science activities for children three to six years of age. The learning activities can be planned on an individual, small-group, or whole-group basis. Often when a science experiment is explained or demonstrated to a whole group it can be adapted to an individual or small-group activity.

An Activities Handbook for Child Care: Science has been compiled to give quick and easy access to science activities appropriate for preschool children. Some are designed to provide practice in classroom related skills, while others will serve to encourage creativity on the part of your students. These activities are suggestions, and are intended to make you aware of the great range of possibilities for enhancing your child care curriculum. The suggestions presented here are not meant to be inclusive.

The visuals included throughout the handbook are for use as bulletin board aides. These can be "blown-up" with an opaque projector or copied onto a transparency sheet and enlarged with the overhead projector. These visuals can be used to present many themes in the home economics curriculum.

Many of the materials included in the handbook are not new, but have been utilized by parents, teachers, and students through the years. These works added a great deal of interest and usefulness to the materials.

For the answers to what shall we teach in science, turn the page. ***Successful Sciencing!***

UNDERSTANDING THE BODY

I. UNDERSTANDING THE BODY

A. Fingerplays

FIVE SENSES

Child guesses word in parentheses:

Our ears tell us when folks are cheering
We call this sense, the sense of ***hearing.*** *(cup hands to ears)*
To use this sense, both day and night
We need our eyes; this sense is ***sight.*** *(pretend to read book)*
To use this sense, as you can tell
I need my nose; this sense is ***smell.*** *(smell flowers)*
When eating food in no great haste
We use this sense and call it ***taste.*** *(lick lollipop)*
We use our hands to feel and clutch
And call this one the sense of ***touch.***
Now you've named the Senses; there are only five
Hearing, Smell, Sight, Taste, Touch

TOUCH GAME

Touch your nose
Touch your chin
That's the way the game begins.

Touch your eye
Touch your knees
Now pretend you're going to sneeze.

Touch your hair
Touch your ear
Touch your two red lips right here.

Touch your elbows
Where they bend
That's the way this touch game ends.

MY EYES CAN SEE

My eyes can see (*make eyeglasses with hands*)
My mouth can talk (*move thumb and index finger as if talking*)
My ears can hear (*cup hand and place it behind ear*)
My feet can walk (*make second and third fingers of right hand walk*)
My nose can smell (*touch nose with index finger of right hand*)
My teeth can bite (*move fingers together and apart as if chewing*)
My lids can flutter (*hold hands up to eyes and flutter fingers*)
My hand can write (*pretend to be holding a pen and writing*)
But when the sandman comes at night and scatters sand
(*scatter sand with right hand*)
Turns out the light (*pretend to turn out the light switch*)
I'll say "good night" (*wave "good night" with right hand*) to you and you.
Each part of me says "good night" too.

TWO LITTLE EYES

Two little eyes that open and close.
Two little ears and one little nose.
Two little cheeks and one little chin.
Two little lips with the teeth closed in.

HANDS ON SHOULDERS

Hands on shoulders, hands on knees,
Hands behind you, if you please.
Touch your shoulders, now your nose,
Now your hair, and now your toes.
Hands up high in the air,
Down at your sides, now touch your hair.
Hands up high as before,
Now clap your hands, one-two-three-four.

HEAD AND SHOULDERS

Head and shoulders, knees and toes, knees and toes, knees and toes.
Head and shoulders, knees and toes, clap your hands tog er.

ON MY HEAD

On my head, my hands I place,
On my shoulders, on my face,
On my hips, and at my side,
Then behind me they will hide.

I will hold them up so high,
Make my fingers quickly fly,
Hold them out in front of me,
Swiftly clap, 1 - 2 - 3.

TWO LITTLE FEET

Two little feet go tap, tap, tap.
Two little hands go clap, clap, clap.
A quick little leap from the chair.
Two little arms reach high in the air.
Two little feet go jump, jump, jump.
Two little hands go thump, thump, thump.
One little body turns around and around.
One little child sits quietly down.

ENUMERATION

I have five fingers on each hand,
(*Hold up both hands, with fingers outspread)*
Ten toes on both feet,
(*Point to feet*)
Two ears, two eyes, one nose, one mouth
With which to gently speak
(*Point to ears, eyes, nose, mouth in turn*)
My hands can clap,
(*Clap hands*)
My feet can tap,
(*Tap feet*)
My eyes can brightly shine,
(*Point to eyes with both index fingers.*)
My ears can hear,
(*Cup hands to ears*)
My nose can smell,
(*Point to nose and sniff*)
My mouth can speak a rhyme.
(*Point to mouth*)

DIFFERENT FINGERS

I have five fingers on this hand.
Each one is different;
Each one does different things.

The thumb is wide and strong.
I use it for pushing thumbtacks into the wall.

The index finger is a long, thin one.
This finger can point to a part of somebody's picture when he is talking about it.

The middle finger is the biggest one of all.
Daddy curls his thumb around it like this,
And flicks the lint off his coat sleeve with it.

The next finger is about the same size as the index finger,
Only it looks different.
This finger is where most people wear their rings.

Last and least is the little finger.
It is cute, like a baby.
And like a baby it can't do much except wiggle.

I have five fingers on this hand.
Each one is different;
Each one does different things.

FEE, FIE, FO, FUM

Fee, fie, fo, fum!
See my finger!
See my thumb!
Fee, fie, fo, fum!

Fee, fie, fo, fum!
Fingers gone and
So is thumb!
Fee, fie, fo, fum!

TEN LITTLE FINGERS

I have ten little fingers
(*Hold fingers up*)
And they all belong to me.
I can make them do things,
Would you like to see?

I can shut them tight
(*Make fist*)
Or open them wide,
I can put them together
(*Palms together*)
Or I can make them hide.
(*Close fists*)

I can make them jump high
(*Open with upward thrust*)
I can make them jump low
I can fold them up quietly
And hold them just so.
(*Rest on lap*)

THUMBMAN SAYS

Thumbman says he'll dance
Thumbman says he'll sing,
Dance and sing you merry little thing.
Thumbman says he'll dance and sing.

"This is sung with pointer, tallman, ringman, and pinkie."

WHERE IS THUMBKIN?

This is sung to the tune of "Freere Jacques." Singers wiggle their fingers one by one in the manner indicated below.

Where is Thumbkin?
(*Put hands behind back*)
Where is Thumbkin?
Here I am;
(*Bring fists forward. Wiggle thumbs*)
Here I am.
(*Wiggle thumbs*)
Run away. Run away.
(*Put hands behind back*)

Repeat song substituting second, third, fourth, and fifth fingers for thumbkin. Wiggle all the fingers on the last verse.

(2.) Where is Pointer?
(*Use index finger*)
(3.) Where is Tall man?
(*Use middle finger*)
(4.) Where is Ring man?
(*Use ring finger*)
(5.) Where is Pinkie?
(*Use little finger*)
(6.) Where are all the men?
(*Wiggle all the fingers and thumb*)
Where are all the men?
Here we are. Here we are.
How are you today, sirs? Very well, we thank you. Run away, run away.

VARIATION: Name the fingers, Mother, Father, Sister, Brother, Baby. End with the whole family.

TWO LITTLE HANDS

Two little hands go clap, clap, clap.
Two little feet go tap, tap, tap.
One little body goes round and round.
One little child sits quietly down.

OPEN SHUT

Open, shut them — open, shut them, to your shoulders fly
Then like little birdies let them flutter in the sky.
Falling, falling almost to the ground.
Quickly pick them up again and roll them round and round,
Faster, faster, slower, slower, clap.

BODY PARTS

I can find my ears, can you? *(touch ears)*
I can find my nose, can you? *(touch nose)*
I can find my elbow, can you?
(Continue using other features they are familiar with.)

COUNT BODY PARTS

Ten little fingers and ten little toes,
Two shiny eyes and one little nose,
Two little ears on the side of my head
One little tongue that is colored red.
Now I have counted all of me
I hope you like the girl/boy you see.

WE ARE ALL MADE OF HINGES

Children act out what the verse says:

e're all made of hinges and everything bends.
We bend at the head and bend at the ends.
We bend in the front and we bend in the back,
If we didn't have hinges we surely woud crack.
(All chidren fall down.)

MYSELF

I am special, look and see;
My feet can run and dance and walk;
My ears can hear;
My mouth can talk;
My hands and arms can stretch out wide;
My face shows how I feel inside.

THE CLAPPING SONG

Have a variety of motions and change of mood. It starts with loud clapping, and ends with hands folded and eyes shut. Children are seated. The words of the song explain the actions.

Let your hands go loudly clap, clap, clap.
Let your fingers briskly snap, snap, snap.
Then fold your hands and quiet be, and quiet be.

Swiftly roll your hands so wide awake.
Let your fingers briskly shake, shake, shake.
Then fold your hands and quiet be, and quiet be.

Let us climb the ladder, do not fall.
Until we reach the steeple tall.
Then fold your hands and quiet be, and quiet be.

CLAP, CLAP, CLAP

Clap, Clap, Clap!
One, two, three.
Who will clap
His hands with me?
Clap, clap, clap!
Clap, clap, clap!
Fold your hands,
Upon your lap!

Roll, roll, roll!
One, two, three.
Who will roll
His hands with me?
Roll, roll, roll!
Round and round.
Roll your hands
Without a sound!

Shake, shake, shake!
One, two, three.
Who will shake
His hands with me?
Shake, shake, shake!
With all your might,
Shake your left, then
Shake your right!

Clap, clap, clap!
One, two, three
Who will clap
His hands with me?
Clap, clap, clap!
Clap, clap, clap!
Fold your hands
Upon your lap.

11

LET YOUR HANDS GO CLAP

Children in a circle or a line. Leader announces the action before each verse. Everyone sings the words to the tune of "Merrily We Roll Along" and does the actions indicated.

1. Touch your toes and then your knees;
   Touch your toes, touch your knees.
   Touch your toes and then your knees;
   And let your hands go clap.

2. Touch the floor and stand up tall;
   Touch the floor, stand up tall.
   Touch the floor and stand up tall;
   And let your feet go stamp.

3. Lift your foot and kick the ball;
   Lift your foot, kick the ball.
   Lift your foot and kick the ball;
   And let your hands go clap.

4. Hug yourself and turn around;
   Hug yourself, turn around.
   Hug yourself and turn around;
   And let your feet go stamp.

5. Lift your knee up in the air;
   Lift your knee in the air.
   Lift your knee up in the air;
   And let your hands go clap.

6. Stand on tiptoe, turn around;
   Turn around, turn around.
   Stand on tiptoe, turn around;
   And let your feet go stamp.

7. Point your toe and take a bow;
   Point your toe, take a bow.
   Point your toe and take a bow;
   And let your hands go clap.

8. Bend your body down and up;
   Down and up, down and up.
   Bend your body down and up;
   And let your feet go stamp.

9. Rock your shoulders side to side;
   Side to side, side to side.
   Rock your shoulders side to side;
   And let your hands go clap.

STAND UP TALL

Stand up tall — hands in the air;
Now sit down in your chair.

Clap your hands — make a frown;
Smile, Smile and flop like a clown.

THE BUNNY

Here is a bunny
With ears so funny,
And here is a hole in the ground.

When a noise he hears,
He wiggles his ears
And jumps in the hole in the ground.

Make a fist with one hand and extend two fingers for ears. Make hole with other hand.

RELAXING TIME

I am sleepy; very sleepy
I want to stretch and yawn.
(Child stretches and yawns.)
I'll close my eyes and just pretend
That daylight time has gone.
(Child closes eyes.)

I'll breathe so softly, be so still
A little mouse might creep
Across the floor because he thought
That I was fast asleep.

I'll listen for a bell to ring
(Pause while children listen.)
Or maybe for a bird to sing. *(Pause)*
I'll listen for a far-off noise,
That tells of busy girls and boys. *(Pause)*

And then I'll be so very still
I'll drop my head far down;
I'll close my legs and make believe
That I'm a sleepy clown.
(*Ask the children to tell what they heard when they were listening*)

QUIET TIME

This is my quiet time
My hands and feet are still
My head is down
My eyes are closed
This is my quiet time.

STILL TIME

(*projected relaxation*)

I've just come in from playing
I'm tired as I can be
I'll cross my legs
And fold my hands
And close my eyes so I can't see.

I will not move my body;
I'll be like Raggedy Ann
My head won't move;
My arms won't move;
I'll just be still because I **can!**

WIGGLES

I wiggle my fingers, I wiggle my toes,
I wiggle my shoulders, I wiggle my nose,
No more wiggles are left in me,
So, I'll be as still as still can be.

B. Learning Activities

1. Self Concept Rhyme

Prepare a felt flannel board figure with removable parts, or cut out parts from a magazine. Put sandpaper strips or felt strips on the back of your magazine pictures, so that they will stick to the flannel board.

One suggestion would be to place the parts near the flannel board and have each child in turn find a picture and place it on the figure as the teacher reads the poem.

It grows on your head,
We brush it up there,
The picture you see
Will show some brown (*HAIR*).

We use these to see with
And it is no surprise
That just below the forehead
We find two bright (*Eyes*).

We use these to smell with
It rhymes with our toes.
Below the two eyes
We will now see a (*Nose*).

Next comes the mouth
Where our words are all said.
It has white teeth and a tongue
And lips that are (*Red*).

Now see the two ears
That are placed near our hair.
When things come in twos
We call them a (*Pair*).

The boys all wear shirts,
This shirt is brand new.
It has black strips around it
But most of all it's (*Blue*).

And out from the sleeves
Of the shirt with black bands
Come two good strong arms
And two five-fingered (*Hands*).

Next comes his trousers
Covering legs left and right.
They fit him just fine —
Not too loose, not too (*Tight*).

His two feet are covered
As he walks through the town,
With shoes that are shiny,
And are polished with (*Brown*).

We now have our boy,
But we're not finished yet,
For standing beside him
Is his very own (*Pet*).

It isn't a turtle,
One way we can tell,
Is its back isn't covered
With a hard turtle (*Shell*).

There's no water to swim in,
And no see-through dish,
So we can be pretty certain
His pet's not a (*Fish*).

The pet doesn't mew,
So I'm very sure that
The animal we're looking for
Isn't a (*Cat*).

I'll give you a hint,
It might make you laugh.
It has a very long neck,
It's a nice tall (*Giraffe*).

2. Smelling Party

Puncture lids of plastic pill containers obtained from a pharmacy. Fill with a variety of common substances which may be distinguished by smell (onions, cinnamon, cloves, cocoa, perfume, peppermint, coffee, soap, pine needles, peanut butter, pickles, etc.). If you cannot obtain lids, use gauze attached by rubber bands as a lid. Be sure substances cannot be seen from outside the container. (Cover clear bottles with aluminum foil, paint, or opaque paper.) Mark each with a number and prepare a key (a chart showing the number and a picture of the contents) so children can determine if their guesses are correct. Very young children will not be able to use a key, and the teacher will direct the activity. Children sniff the containers and guess what each contains.

VARIATIONS: Child sniffs one bottle and selects a picture of the object matching the object's smell.

3. **Feely Meely Box**

Place a variety of materials that differ in texture (sandpaper, velvet, fake fur, pinecone, satin, corduroy, smooth wood, vinyl, tile, etc.) in a closed box that has a hole large enough for a child's hand cut in one side. Children reach through the hole, feel the objects, and describe the objects. The teacher should ask questions about the texture of the object (hard, soft, rough, slick, stiff, etc.). Objects should be changed regularly.

VARIATION: "Sock Boxes"

Stuff 10 quart-sized plastic containers into 10 socks. Place one object in each sock box (feather, jack, pencil, toothbrush, large nail, walnut, blunt scissors, toy car, paper clip, buttons, etc.). The child puts his/her hand into the sock box and feels the item inside. The child sorts through 10 pictures that match the objects in the boxes, and finds the one that matches what he/she feels. The child places the picture on top of the sock box, and repeats this procedure for each box.

4. **Feely Board**

Collect two identical sets of materials (elastic, macaroni, velvet, sponge, sandpaper, corrugated paper, rice, etc.). Glue one set to 3" x 5" pieces of heavy cardboard and one set to an answerboard. Wearing a blindfold, the child matches each card to its mate on the answerboard by feeling the textures.

5. **Go Together Bottles**

Place 20 objects (key, water, peanuts, pennies, candles, match, pencil, eraser, etc.) in 20 baby-food jars with lids. Collect 20 pictures that go with the objects in the jars (door, bathtub, peanuts in shell, piggy bank, cake, fire, pencil, etc.) The child takes the jars with the objects and places them so the objects can be seen inside each jar. Then the child takes the pictures and places them on top of the appropriate jars.

6. **Facial Features**

On faces that have been cut out of construction paper, have children paste on construction paper ears where they think they should go.

7. **Touching**

Have children feel outdoor equipment, dirt, leaves, trees. Do they feel soft, hard, cold, etc.?

8. **Take a Feeling Walk**

Take a walk for children to feel air on their faces, sun on their head, grass or concrete, etc. Ask, "How does it feel?"

9. **Hot and Cold Temperatures**

   a.) *Hold a magnifying glass in the bright sunlight (preferably in the middle of the day). Ask each child to put his/her hand under the glass until he/she feels his/her hand beginning to get warm.*

   b.) *Hold an ice cube in your hand. How does your skin feel and look? Put on gloves and hold the piece again. Does it take as long for hands to become cold and stiff? Does this give a clue to taking care of our bodies?*

10. **Respiration**

   Children must casually learn they need plenty of air to breathe. Have the children feel the expansion of the lower part of the lungs with deep breathing. Have the children run a few minutes then feel breathing again.

11. **Babies**

   Invite a mother with a baby to visit. Ask the mother to talk about: age of the baby, what baby eats, how much sleep does baby need. Each child might bring a snapshot of themselves at an early age.

12. **Tasting Party**

   Collect a variety of common foods (apples, popcorn, bread, dry cereal, pickles, peanut butter, chocolate chips). Have children close their eyes. Put a small amount of food in each child's mouth. Have the children guess what they are tasting.

   VARIATION: Have children hold their noses as well as close their eyes. Place food in their mouths and have them guess what they are tasting. Smelling something helps to tell how it tastes.

13. **Texture Handprints**

   Handprints of various textures can be placed around the room at the children's level. When they match their hands on top, they should be encouraged to describe the textures they feel.

14. **Texture Book**

   Texture packet or book can be made by giving each child an envelope containing items with textures that match those found on the pictures that will be shown. As the picture is shown and a particular texture described, the child selects the item with the matching texture. For example, show a picture of a cat having a tongue made of sandpaper. The child may be told, "Put your hand in your envelope and find something that feels just like this cat's tongue." The child may need to feel the cat's tongue, and also be encouraged to describe how the cat's tongue feels.

15. **Body Images**

   Draw body images of the children. The children lie on a sheet of butcher paper while a teacher draws around the body shape. After being decorated, the images are displayed around the room so that the size and shape variations of the children can easily be observed.

16. Photographs

Take photographs of individual children. Photograph the entire child, not just the head. These photographs can be used for learning about sizes and shapes of people.

17. Hand and Foot Prints

Using tempera paint, make hand and foot prints of each child. This activity is time consuming and requires constant teacher supervision. Work with small groups of children, and have a washing tub and towel on the spot. As children complete the activity, immediately wash their hands and/or feet. Young children will require help in replacing their shoes. This activity can be repeated periodically to compare growth. A collection of these makes a nice Mother's or Father's Day gift.

18. Clothes

Put articles of clothing in a sack or box (gloves, boots, sweater, hat, sandals, swimsuit, pajamas, etc.). As one child reaches in and pulls out an article, the other children say when and where it would be appropriately worn.

19. Sound Boxes

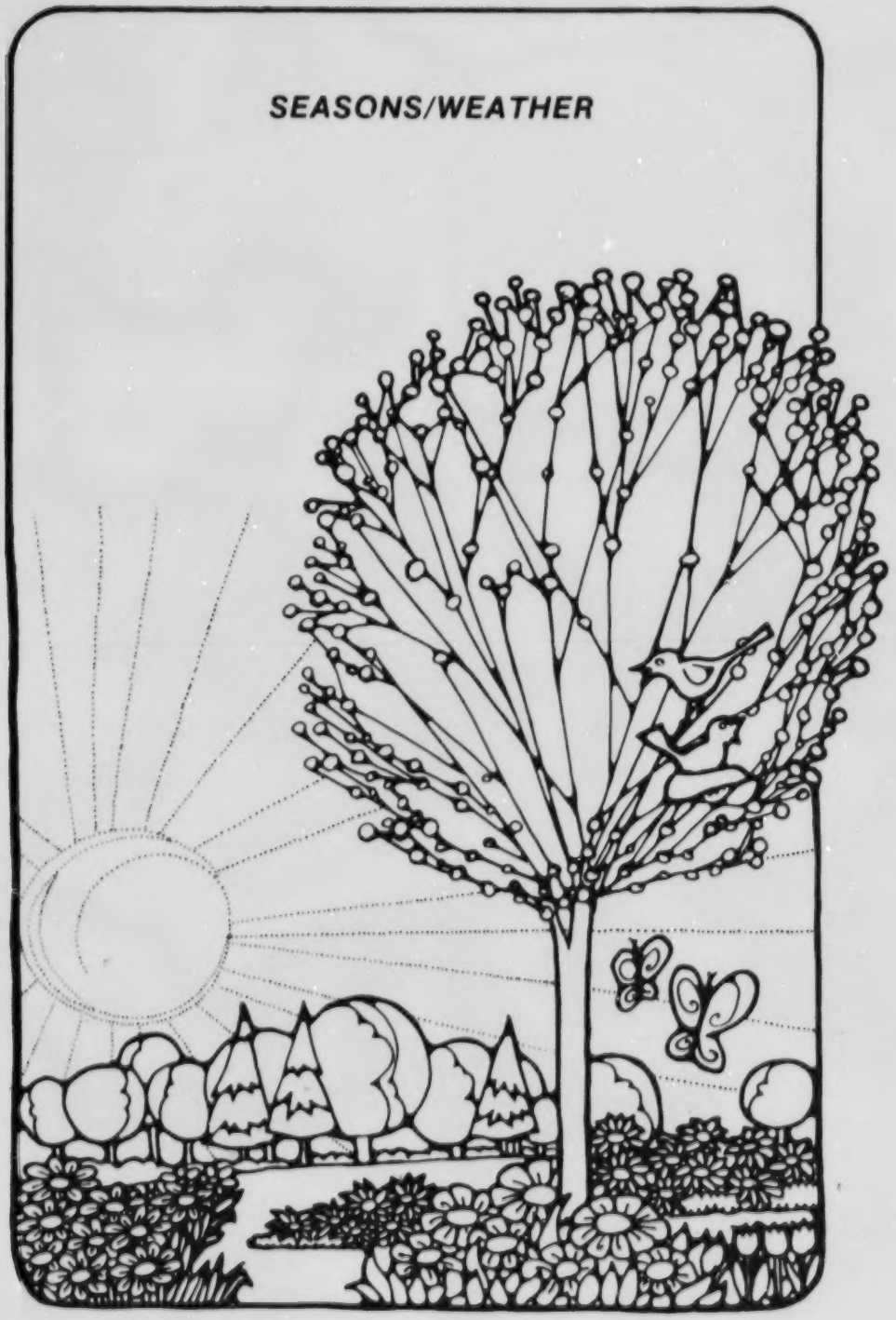
Using clean school milk cartons, make ***two*** *containers each of ½ cup rice, ½ cup salt or sand, sets of jingle bells, sets of pennies, small balls, ¼ cup beans, etc. Seal thoroughly. The child sorts the containers according to the sound made when he/she shakes them, placing each identical pair on an answerboard. Empty film cans are excellent for this activity.*

20. Sounds

Use commercial sound records such as those in the Peabody Kit, or tape record sounds and have the children determine what the sounds are. Sounds selected should be familiar ones and should be heard long enough on the tape so that the children can hear them adequately. These activities could be divided into tapes of "Sounds Around the House," "Sounds of Animals," etc. The following suggestions are kinds of sound that can be used with this activity:

a. *Liquid boiling*
b. *Food frying*
c. *Batter being strirred*
d. *Blowing of bubbles*
e. *Peeling of a carrot*
f. *Doorbell ringing*
g. *Oven timer buzzing*
h. *Water running*
i. *Toilet flushing*
j. *Bathroom scales — as a person steps on or off*
k. *Car starting, windshield wipers working, seat belts being fastened, gears being shifted*
l. *Traffic moving*
m. *Dog barking, other familiar animal sounds*
n. *Telephone ringing*

SEASONS/WEATHER



II. SEASONS/WEATHER

A. Fingerplays

FALLING LEAVES

Little leaves fall gently down,
Red, yellow, orange, and brown.
Whirling, whirling, round and round,
Falling without a sound;
Falling softly to the ground.
Down and down and down and down!

FALL POEM

From the boughs o'er head
the leaves come falling down.
Some are flaming red
Some are withered brown
So they flutter through the air
twisting, turning, twirling
lie scattered everywhere.

A LITTLE GROUNDHOG

A little groundhog,
  Lives cozy and snug,
In an underground house
  Like a bug in a rug.

One day bright and early,
  He poked out his head,
"I wonder if spring has come,"
  He said.

He hopped from his burrow
  And started to run,
And then saw his shadow
  Cast by the sun.

Oh dear, Oh dear!
  He cried in fright,
I came out too soon,
  And he ducked out of sight.

Back into his underground house
  He crept,
And for six more winter weeks
  He slept and slept.

Out he came running
  One sunny spring day,
This time no shadow,
  This time to stay.

SPRING HAS COME

(Divide children into four groups — raindrops, sunbeams, birds, flowers)

"Wake up," said the little raindrops,
(Raindrops rise quickly from chairs)
"Wake up," said the sunbeams, too.
(Sunbeams rise quickly)
"Spring has come," sang a bird;
(Birds rise and flutter wings)
Then the little flowers heard,
(Flowers rise slowly)
So they all woke up and grew.

RAIN

The rain is falling down—
The rain is falling down—
Pitter patter, pitter, patter,
The rain is falling down.

Pitter patter-patter pitter
See the rain drops pour
Pitter patter-pitter patter
Better stay indoors.

RAIN

Pitter, pitter pat, gentle rain drops tap,
Rain is falling down, rain is falling down.

MY SNOWMAN

I made a little Snowman
(go through the motions of making a snowman)
With hat and cane complete
(Touch head and then pretend to grip cane)
With shiny buttons on his coat
(Pretend to show buttons down front)
And shoes upon his feet.
(Bend hands to represent shoes)
But I know when the sun comes out
(Curve fingers into a ball)
My snowman will go away
(Make second and third fingers on hand "run")
So I"ll put him in our big deep freeze
(Pretend to lower something)
And he'll be sure to stay.

LITTLE JACK FROST

Little Jack Frost must have come last night
(Hold fingers together and move the entire hand in an arc in the air)
For this morning my windows were painted white.
(Paint in the air)
There were pictures of palaces and knights of old
(Show palace in air)
And planes and ships with sails unfold.
(Cross hands and move in the air to represent a plane flying. For ship place one hand horizontal and one hand vertical to represent a ship and sail. Move slowly as if sailing.)

JACK FROST

Jack Frost is here Today
Jack Frost is here Today
He nips your nose
(Pinch nose)
And bites your toes
(Touch toes)
Jack Frost is here today.

WIND AND SNOW

"Wooooooooo" went the wind
Out went the lights.
And the snow flakes were falling
All through the night.

A WONDERFUL WINTER SURPRISE

Five little snowflakes, high, high, high,
Started down to earth from a cloud in the sky.
The first little snowflake said, "What fun!"
The second one whispered. "I see the sun!"
The third one said, "Let's all stay together!
We might melt in warm sunny weather."
The fourth one sighed, "Are we going far?"
And here is the fifth one—a beautiful star!

(Have a small snowflake cut from thin white paper attached to little finger.)

"FIVE LITTLE SNOWMEN"

Five little snowmen standing by the gate.
The first one said, "It's getting late."
The second one said, "There's something in the air."
The third one said, "Who's there, who's there?"
The fourth one said, "It's old Mr. Sun."
The fifth one said, "Let's run, let's run."

SNOW FLAKES

Snow flakes, Snow flakes
Falling from the sky
Snow flakes, Snow flakes
Piling up so high.

(Hands pretending to be snow falling)

BIRDS

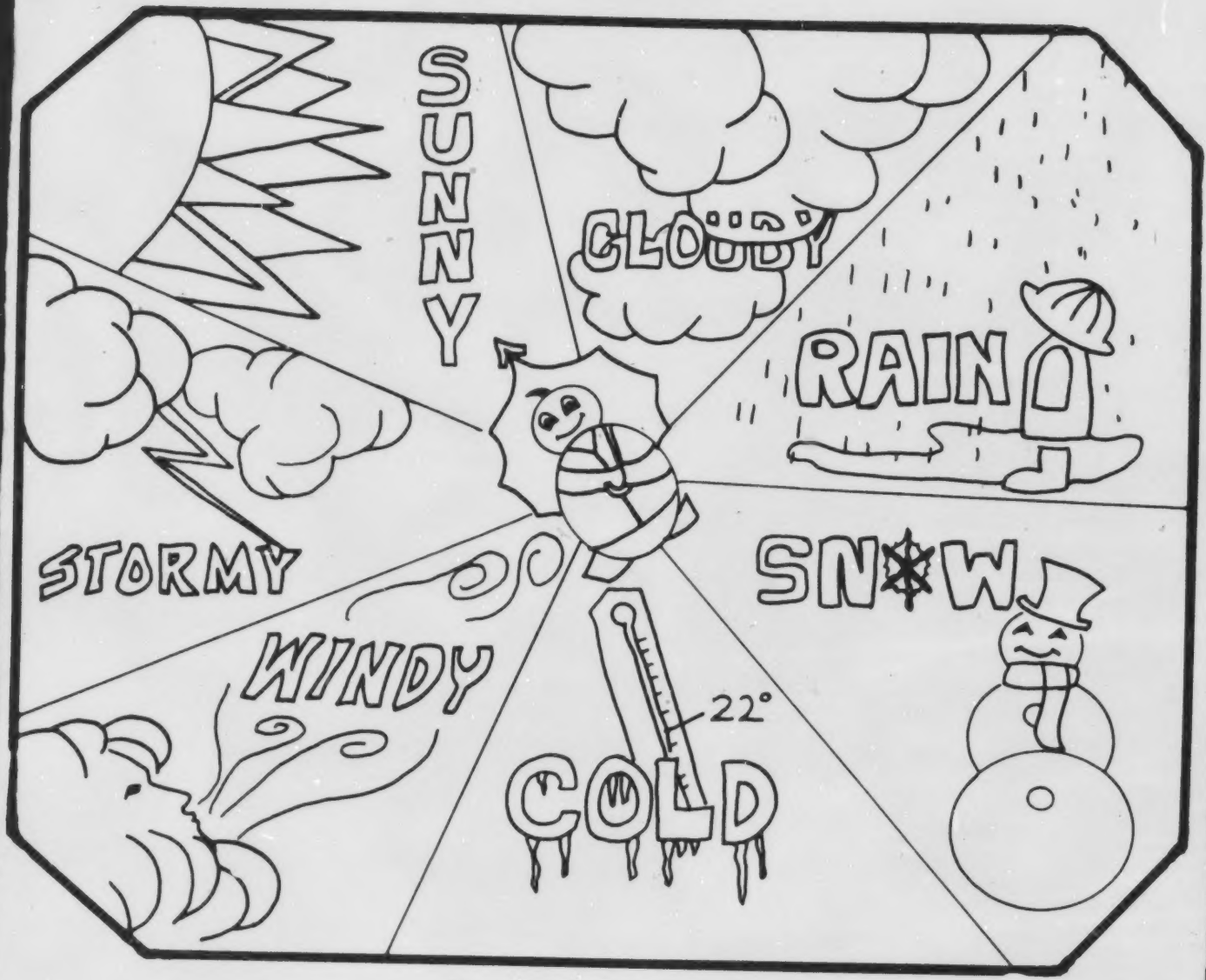
Father bird and mother bird built a nest together
Way up high near the sky,
Safe from any weather
Safe from any weather.

I WISH I WERE A LITTLE WINDMILL

I wish I were a windmill strong
I'd have big arms so big and long
When the wind would softly blow
my big arms around would go,
round and round and round and round
When the wind would softly blow
my big arms around would go.

THREE FUNNY MEN

Three funny men from our town
Went out for a walk one day;
The wind blew so hard
That it turned them around,
And they walked the other way,
Yes, they walked the other way.


SUNNY
CLOUDY
RAIN
STORMY
WINDY
22°
COLD
SNOW

B. Learning Activities

1. Rain

Boil water in a saucepan. Keep the water boiling; hold the lid or plate over the pan but not on it. A thin film of steam covers the plate, and when more steam comes tiny drops of water form on the lid and fall back into the pan. When water is heated it evaporates and becomes steam. When it is cooled it condenses and becomes water again. The water droplets are like rain that falls. This is just how we get rain. There are lots of tiny drops of water that make a cloud. When these drops are cooled and get too heavy, they have to fall to the ground, and we get rain.

2. Weather Changes.

Make a chart depicting the four seasons. Use clothing which is representative of each season. Cover areas of the chart not being used.

3. Weather Calendar.

Discuss and record weather each day on the calendar. Use symbols that depict sunny, cloudy, rainy, snowy, cold, windy, stormy. These symbols are placed on the day after a weather discussion. Sing weather song: "Weather, weather, what does the weatherperson say today? He/she says it's ***cloudy, cloudy. Cloudy,*** *says the weatherperson today." Each day a different child is chosen to lead the song and place the weather symbol.*

Variation: WEATHER CHART. *(See illustration on previous page.) Children can help decide where the little weatherperson should point. They will become more aware of the role weather plays in their lives.*

4. Day and Night.

Begin a discussion with children about what they do during the day and at night. Lead into questions about what causes the change from day to night, and night to day. In a closet, a large packing box or other place that can be darkened, set up a globe and station a flashlight or light bulb in such a way that it will shine most directly on the equator. Show children the approximate area where they live. Have them mark it with a piece of colored tape or a pin. Have the children spin the globe and note where the marked area is in relation to the light. The globe and light activity would not be appropriate for young preprimary children, although older preprimary children can understand the idea that at night they are "not where the sun shines."

5. Clouds

Pour boiling water into a milk bottle. When the bottle becomes hot, pour out all but one inch of the water. Stretch a thin cloth over the mouth of the bottle. Put crushed ice on the cloth and fasten it in place. Clouds form as water vapor in the air cools, condenses and changes to tiny drops of liquid. As these droplets become so heavy and large that the cloud cannot hold them, they fall as rain.

6. Lightning.

In a dark room rub two long inflated balloons on your clothes, a rug, or draperies. Hold each end, one to the other, almost touching. If the room is dark enough, a spark will jump between the two balloons. That spark is "electricity". Sparks result from friction. If the balloons had been clouds, the sparks would have been lightning. Lightning is electricity we see in the sky.

7. Thunder

Blow up a paper bag and hold neck tightly so air cannot escape. Hit the bag with the other hand. The bag will break with a loud bang. When air rushes together it makes a loud noise. Lightning forces air apart, and when the air rushes together forcing the air apart, you will then hear thunder as the air rushes back together.

8. Rainbow

a. *Turn a garden hose on to a fine spray. Stand with your back to the sun. You will see a rainbow in the fine spray of water.*

b. *Place a small mirror in a glass of water. Place the glass so the sun can shine on the mirror. Turn the glass until the rainbow is reflected against the wall or ceiling. Observe the colors of the rainbow. The sun is made up of all the colors in the rainbow mixed up together. When sunlight hits raindrops or water, the colors are separated.*

NOTE: This conclusion is often too complex for the very young child to understand. If he is at the pre-operational stage his response might be "Oh, that's magic; let me see you do that again!" or "Let me do it." The teacher should encourge this interest and excitement by letting the child "make" his own rainbow. She can help develop an attitude of "things happen for reasons" and "we can look for answers." Arriving at the "correct" conclusion is not always the only objective in an experiment.

9. Rainbows #2

Fill a jar with water and place it on a window sill where there is sunlight, or hang a prism in a window. Hold white paper in front of the jar or prism so that the sun shines through onto the paper. Bands of color (a rainbow) will appear on the paper. Ask the children to identify the colors and order in which they appear. Ask them to recall rainbows they have seen. What kind of weather was there when they saw the rainbow? Was it raining? Was the sun shining? Or both?

***Variation:** Give children soap solution and pipes outside on a sunny day. Encourage them to notice and talk about the colors they see in the bubbles.*

10. The Seasons

Help children notice changes in the seasons by commenting about new plant growth, need for outdoor clothing, frequency of rain, sleet and/or snow, etc. For pre-primary children, the focus should be observation of the indicators of seasonal changes as well as the names for each.

11. Temperature

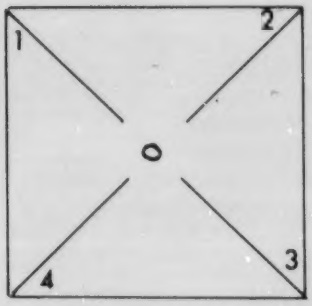
Mount a large outdoor thermometer where children can see it. This provides a good ongoing experience which ties in with the study of seasons. Preprimary children should not be expected to master reading the thermometer, but they can understand that "when the red line goes up it is hot outside, and when it goes down it is cold outside." If a few annual plants of some type are placed outside, children can relate seasonal changes to growing seasons, because they will be able to see the adverse effects of low temperatures on plants.

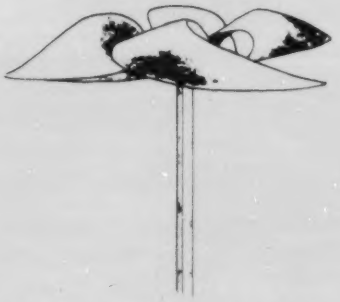
12. Weather Station

For younger children, provide a large cardboard doll and paper clothes. The children observe the daily weather, and dress the doll appropriately. Sometimes the weather will change within the day, so the doll's clothes may need to be changed more than once a day. Be sure to include all types of clothes for the doll and not design them to indicate the doll is necessarily a boy or girl. The boy and girl dolls and clothes in the Peabody Kit are excellent. Older preprimary and kindergarten children will be able to place weather pictures on a daily calendar.

13. Wind

Make pinwheels for each child. Diagram shown.





Use mounting pins with large heads and pin pinwheel into the eraser of a pencil.

Take pinwheels outside and hold them in the wind. Talk with children about what makes the pinwheel move. When the wind stops and the pinwheel is still, help children think of other ways to make the pinwheel move. Some possible solutions are blowing on them or using a small electric fan (with a good screen guard).

14. Ice

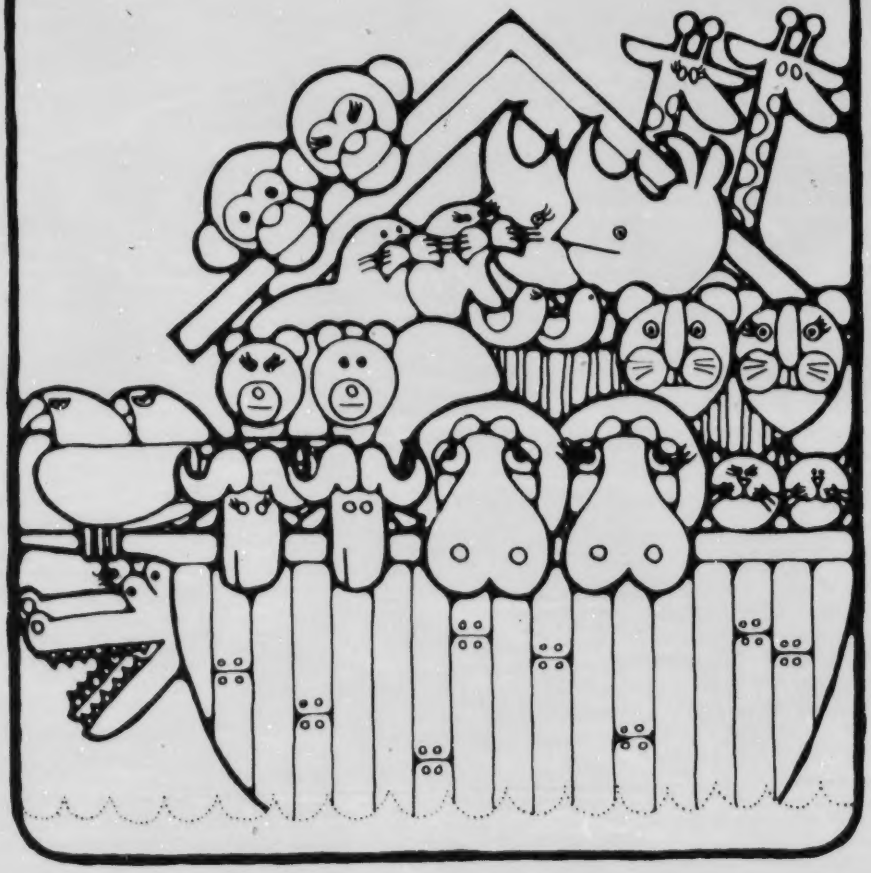
If it is cold enough, let each child put a small pan of water outside the first thing in the morning, and let them check before going home to see if the water is frozen. (Metal pot pie pans are good to use.) If the water has not frozen, leave the pans outside until the next morning. When ice forms, let the children bring it in the room to feel and look at under a magnifying glass and to watch it melt. Why did the water turn to ice and then back to water? This is best done in small groups during the day.

If you live in a locale where there is snow, have children observe and discuss: what is snow, what causes it, and from where has it come. If you have no snowy season, prepare a bulletin board of snow scenes. Children are curious about snow. They see pictures in books, on television and need information. Encourage children to brainstorm and to share ideas.

15. Snow

Snow is actually frozen water that is caused or formed when the water vapor in the atmosphere freezes. When the vapor freezes, transparent crystals are formed. The air currents cause the crystals to go up and down in the atmosphere, and the crystals then begin to gather around tiny particles that are in the clouds. When a group of ice crystals is big enough, it floats or falls to earth in the form of a snowflake. The ice crystals in a snowflake always arrange themselves to form a six-pointed star—a thin plate shaped like a hexagon. Each branch, or part, of the six-pointed star is exactly like the others. Although all the branches of a particular snowflake are alike, no two snowflakes have ever been found that were exactly alike.

ANIMALS



III. Animals

A. Fingerplays

FIVE LITTLE SPECKLED FROGS

Five little speckled frogs sat on a speckled log
Eating a most delicious bug. Yum, yum, yum
One fell into the pool, where it was nice and cool.
Now there are 4 speckled frogs. Grup, grup, grup

Four little speckled frogs sat on a speckled log
Eating a most delicious bug. Yum, yum, yum
One fell into the pool, where it was nice and cool.
Now there are 3 speckled frogs. Grup, grup, grup

Three little speckled frogs sat on a speckled log
Eating a most delicious bug. Yum, Yum, Yum
One fell into the pool, where it was nice and cool.
Now there are 2 speckled frogs. Grup, grup, grup

Two little speckled frogs sat on a speckled log
Eating a most delicious bug. Yum, yum, yum
One fell into the pool, where it was nice and cool.
Now there is 1 speckled frog. Grup, grup, grup

One little speckled frog sat on a speckled log
Eating a most delicious bug. Yum, yum, yum
One fell into the pool, where it was nice and cool.
Now there are no speckled frogs. Grup, grup. grup.

FROGGIE

This little froggie broke his toe
This little froggie broke his toe *(thumb)*
This little froggie said Oh, Oh, Oh, *(1st finger)*
This little froggie laughed and was glad *(2nd finger)*
This little froggie cried and was sad *(3rd finger)*
This little froggie, so kind and good *(4th finger)*
Hopped off to the doctor as fast as he could

ANIMALS

This is the silkworm that wiggles and crawls
This is the thread that she weaves.
This is the dress that the silk made for me,
Here are the collar and sleeves.

This is the sheep in the meadow so green,
These are her baby lambs three.
These are the scissors that clip, clip her wool,
To make pretty mittens for me.

This is the moo-cow with horns in her head,
This is her long swishy tail.
This is the milk that she gives us to drink,
Creamy and white in a pail.

THE LITTLE RABBIT

See the little rabbit
With his ears so long.
He stays so very still,
But I'm sure he hears

For I say, "Little rabbit,
Stop, stop, stop."
But away he goes
Hop, hop, hop.

BUNNY RABBIT

Little Bunny Rabbit, as you hop along, stop for just
a minute and listen to my song.
Your tail is Oh, so short and your ears are very long.
Little Bunny Rabbit do you like my song?

This is the bunny with ears so funny,
(Hold pointer and little fingers up)
And this is the hole in the ground.
(Make circle with thumb and finger of other hand)
When a noise he hears he pricks up his ears,
(Straightened fingers up)
And then he jumps into the ground.
(Put pointer finger in "hole")

TEENCY WEENCY SPIDER

Teency Weency Spider
Climbed up the water spout
Down came the rain
And washed the spider out
Out came the sun
And dried up all the rain
And Teency Weency Spider
Climbed up the spout again.

CREEPY BUG

Put your left arm straight out. Your right fingers are a creepy bug. Move them up your arm as you say the verse.

Creepy bug goes up and up
(Move fingers rather fast up extended arm)
And up, and up and up.
And all around your head.
(Move fingers slowly around neck)
And down and down.
(Move fingers rapidly down arm)
And down and down.
(Drop arm suddenly)
Woops!
(Shake off imaginary bug)
He's dead!
(Step on it)

CATERPILLAR, CATERPILLAR

Caterpillar, caterpillar, brown and furry
(move hand forward, wiggle thumb)
Winter has come and you'd better hurry
(flutter fingers)
Find a big leaf under which to creep
(make second and third fingers creep)
Spin a cocoon in which to sleep
(rotate thumb and wrap other hand around it)
Then when warm weather comes this way
You'll be a butterfly and fly away
(Stretch fingers of both hands and interlock hands. Flutter fingers.)

CATERPILLAR

"Let's go to sleep" the little caterpillars said.
(Bend ten fingers into palm)
As they tucked themselves into their beds.
They will awaken by and by.
(Slowly unfold and hold up fingers)
And each one will be a lovely butterfly!
(Hands make flying motion)

THEY LIVED IN A BARN

The leader reads the verse. Children join in making the noises or mouthing the words sliently as directed.

There was a little cat that said — *(Meow, Meow)*
There was a little dog that said *(Bow Wow)*
There was a little bird that said *(Peep, Peep)*
And they lived in a barn that couldn't say a word
(Shake head and silently mouth, "Couldn't say a word")

The cat saw the bird, and said *(Meow, Meow)*
The dog heard the cat and said *(Bow Wow)*
There was a little bird that said *(Peep, Peep)*
The barn heard it all but couldn't say a word.
(Shake head and silently mouth, "Couldn't say a word")

The cat chased the bird and said *(Meow, Meow)*
The dog chased the cat and said *(Bow Wow)*
The bird flew away and said *(Peep, Peep)*
The barn saw it all and couldn't say a word. *(Shake head, etc.)*

The cat was sad and said *(Meow, Meow)*
The dog was glad and said *(Bow Wow)*
The bird was glad and said *(Peep, Peep)*
The barn was glad, but couldn 't say a word. *(Shake head, etc.)*

The cat ran away and said *(Meow, Meow)*
The dog went out to play and said *(Bow, Wow)*
The bird found another home and said *(Peep, Peep)*
The barn couldn't move and couldn't say a word. *(Shake head, etc.)*

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Sometimes I play I'm a cat and say *(Meow, Meow)*
Sometimes I play I'm a dog and say *(Bow Wow)*
Sometimes I play I'm a bird and say *(Peep, Peep)*
Sometimes I play I'm a barn, and don't say a word.
(Shake head and silently mouth "Don't say a word.")

FUZZY

Fuzzy is a kitten nice, soft and fat
Fuzzy plays with Susan; feet go pitter pat
Fuzzy's tail is fluffy; face is clean and fat
Fuzzy has no wash cloth; funny fuzzy pet.

KITTY

The little kitty laps her milk.
Lap, lap, lap
Her tongue goes out, her tongue goes in
Lap, lap, lap.

KITTY

This kitty said, "I smell a mouse."
This kitty said, "Let's hunt thru the house."
This kitty said, "Let's play we're asleep."
This kitty said, "Let's go creepty, creep."
This kitty said, "Meow, Meow, Meow."
I saw him go thru his hole just now.

WALK QUIETLY

"Here comes Kitty walking round and round;
He has cushions on his feet and doesn't make a sound."

KITTY, KITTY

Kitty, kitty, kitty, kitty,
All my little ones so pretty,
You and you and you and you
(Point to children)
Let me hear how you can mew
(children mew)
Kitty, kitty, kitty, kitty
All my little ones are so pretty.
Curl up close now just like that
(put hands on arms)
Sleep till someone calls out scat
(keep hands down until some child calls scat)

WOODPECKER

The woodpecker pecked out a little round hole
(use 2 fingers in circle)
And made him a house in a telephone pole
(hands come to point above head)
When the streams of rain pour out of the sky
(move hands up and down like rain)
And the ribbons of lightning go flashing by
And the great big bolts of thunder roll
(roll arms in circle form)
He can snuggle back in his telephone pole.

SWINGING BIRDS

Two tall telephone poles
(hold up hands, palms inward, pointer finger erect)
Across them a wire is strung
(extend middle fingers until they touch at tips)
Two birds hopped on
(move thumbs, touch extended middle fingers)
And swing and swing and swing.

BIRDS

Five little birds,
Up in the tree is a little bird's nest
Within it two eggs undeneath birdie's breast,
Crack-cracking the eggs, both the birdlings come
They soon grow quite big, hop-hop-hopping about.
The mother bird says "Look, I'll teach you to fly"
So spreading their wings, they're off — saying goodbye.

FIVE LITTLE ROBINS

Five little robins
Happy as can be.

The mother, the father and their
babies three

The mother caught a bug
And all the little robins began to tug.

This one got the bug, this one got the worm.
And the littlest baby robin said, "next time is my turn."

THE WISE OLD OWL

The wise old owl
(Make fists of both hands. Cross wrists and place backs of fist together to make two round eyes)
Who sits in the tree
Is not as wise as he can be
Along with "whoo." As he asks now
He should ask "Where" and "When" and "How"

(Outstretch fingers of both hands. Cross and lock thumbs. Flutter fingers.)

LITTLE MICE

Let us all be little mice
Looking for a piece of cheese. tiptoe, tiptoe, tiptoe
Watch your step, don't make a noise,
Do not cough and do not sneeze. Tiptoe, tiptoe, tiptoe . . .
Pussy cat is sleeping near, sshh.....be careful, she will hear.
Tiptoe, tiptoe, tiptoe.

(Children tiptoe quietly around the room as one child pretends to be the pussy cat asleep.)

SQUIRRELS

Five little squirrels sitting in a tree
This one said, "What do I see?"
This one said, "I see a gun.
This one said, "Oh, let's run."

This one said, "I'm not afraid"
(Count off fingers)
"Bang" goes the gun
(clap hands)
And away they all run.
(hand behind back)

TEDDY BEAR

Teddy bear, teddy bear, turn around
Teddy bear, teddy bear, touch the ground.
Teddy bear, teddy bear, touch your shoe
Teddy bear, teddy bear, how are you?
(shakes hands)
Teddy bear, teddy bear, go upstairs.
(finger motion)
Teddy bear, teddy bear, say your prayers.
(hands clasped)
Teddy bear, teddy bear, turn out the lights
Teddy bear, teddy bear, say "goodnight."

SOFT THINGS

(projected feeling of quiet)

Teacher: Little fluffy kitten, soft, soft fur,
Stroke it gently, it will say,
Children: Purr, purr, purr
Teacher: Little wooly puppy dog, soft, not rough
Stroke it gently, it will say
Children: Wuff, wuff, wuff.
Teacher: Little downy chickens, cuddled down asleep,
Stroke them gently, they will say,
Children: Peep, peep, peep.
Teacher: Little yellow duckling, soft velvet back,
Stroke it gently, it will say,
Children: Quack, quack, quack.

FUZZY DUCKLINGS

Ten fuzzy ducklings
(Hold up ten fingers)
Swimming in the lake — Quack, quack, quack.
They give their heads a shake
(Wiggle fingers)
Bang! Bang! Bang!
(Clap hands three times)
Goes Tommy's toy gun, and away to their mother
The ten little ducklings run.
(Place hands behind back)

LITTLE DUCKY DUDDLE

Little Ducky Duddle, went wading in a puddle,
Went wading in a puddle one day.
He said it doesn't matter, how much I splash or splatter
How much I splash or splatter all day.

MR. TURKEY AND MR. DUCK

Mr. Turkey took a walk one day
In the very best of weather.
He met Mr. Duck on the way
And they both talked together.
"Gobble, gobble, gobble"
"quack, quack, quack"
"Good bye, good bye"
And they both walked back.

Hands are closed with thumbs up for turkey and duck, hands come from behind back to "walk". Thumbs move for "gobble" and "quack".

THE COWS

Here is the barn so big; don't you see?
In walk the cows — One, Two, Three.
Soon there'll be milk for you and me.

TWO MOTHER PIGS

Two mother pigs lived in a pen
(hold up thumbs),
Each had four babies, and that made ten
(raise all fingers on both hands).
These four babies were black as night
(extend four fingers on one hand),
These four babies were black and white
(hold up four fingers of other hand).
But all eight babies loved to play,
And they rolled and rolled in the mud all day
(wiggle fingers over each other).
At night, with their mothers, they curled up in a heap,
They closed their eyes and they went to sleep.

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CALF

This little calf eats grass
(Picks out fingers as cows)
This little calf eats hay,
This little calf drinks water,
This little calf does nothing at all.
But lie around all day
(Let fingers lay down)
This little calf runs away.

FISH

Five little fish
Swimming in a pool
This one says: "The pool is cool"
This one says: "The pool is deep"
This one says: "I'd like to sleep"
This one says: "I'll float and dip"
This one says: "I see a ship"
Fisherman's boat comes
Line goes — Splash!
Away our five little fish dash.
(clap)

ANIMAL BABIES

I see one kitten sitting in a hat,
it is the baby of Mrs. Cat.
I see two piglets dancing in a jig,
they are the babies of Mrs. Pig.
I see two tadpoles rolling in a bog,
they are the babies of Mrs. Frog.
I see four fuzzy cubs sleeping in a lair,
they are the babies of Mrs. Bear.
I see five yellow chicks playing in a pen,
they are the babies of Mrs. Hen.

(Begin by making a fist of right hand witn thumb outstretched, raising one finger each time a baby is mentioned until all five fingers are up.)

OCTOPUS SONG

8 long legs and 2 big eyes, salty tears when he cries;
Digs his home at the bottom of the sea. Can you guess what he can be?
Watch him wiggle, watch him slide; try to catch him, watch him hide.
Feed him a fish so he won't fuss, . . . **He's a Baby Octopus.**

ONCE I SAW A BEEHIVE

Once I saw a behive
(hump hands together to form hive)
Out in the maple tree.
I said, Little honeybees
Come out and play with me.
Bzzzzzzzzzz went the honey bees
Inside the hive.
(Motion of peeking inside the hive.)
And then they came out — One, two, three, four, five
(Show 1 finger at a time)

Here are the bee hives
(make a fist of hand)
Where are the bees?
Hidden away where nobody sees.
Soon they'll come creeping.
Out of the hives — One, two, three, four, five
(fingers come out)
Buzz -z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z-z

SKUNK

There was once a little skunk
Who went into a hole,
(make a fist out of the left hand,)
point the second finger to the right hand)
Along came a little boy with a great big pole
(two lower fingers are for boy—the middle finger is the pole)

The skunk says, "Go away"
The boys says, "No I'll stay."
He just wouldn't listen
until the skunk had this to say----------
"Sphseeeeeeeeeee!
(right hand moves quickly from left)

ANIMAL MOVES

This is the way the elephant goes
With curly trunk instead of nose
(clasp hands, extend, move back and forth)
The buffalo, all shaggy and fat
Has two sharp horns in place of a hat.
(pointer fingers on head)
The hippo with his mouth so wide
Lets you see what is inside
(hands together and open and close)
The wiggly snake upon the ground
Crawls along without a sound
(weave hands)
But monkey see and monkey do,
Are the funniest animals in the zoo!
(thumbs in ears and wiggle hands)

THE ELEPHANT

The elephant has a trunk for a nose!
And up and down is the way it goes;
(Clasp hands together, extend arms, and raise and lower them)
He wears such a saggy, baggy hide!
(Relax body)
Do you think two elephants would fit inside?
(Hold up two fingers)

THE ELEPHANT

The elephant is so big
He has no hands,
He has no toes,
But oh my goodness,
What a nose!
(Use arms for elephant. Point to hand and toes. Make a trunk with hands. Use for Circus Unit.)

"THE ANTS"

Once I saw an ant-hill
With no ants about,
So I said, "Dear little ants,
Won't you please come out?"
Then as if the little ants
Had heard my call . . . . . .
One...two...three...four...five came out!
And that was all!

B. Learning Activities

1. Animal Habitat

Have several sets of pictures of animals that "live in water," "live on land," and "live in the air." The child sorts the pictures under the appropriate categories, placing together the animals which live in the water, those which live on land, and those which live in the air. Draw a classification board showing pictures of lands, clouds, and water for child to use as he draws conclusions about each animal pictured.

2. Tadpole to Frog

How do tadpoles turn into frogs? Put frog eggs, pond water, and plants in a terrarium and watch daily for tadpoles to hatch. Soon tadpoles or pollywogs will hatch. Boiled spinach or other leafy vegetables and the yolk of a hard boiled egg can be added for extra food supply for the growing tadpoles. Large rocks and dry areas will need to be provided in the terrarium as the frogs develop, or they can be returned to their natural environment. Grown frogs like to eat bugs, spiders, worms, and insects.

NOTE: Frog eggs can be found in a stream, pond or lake.

3. Animal Protection

Animals protect themselves in various ways. Show pictures, films, filmstrips of: Ex: Aileen Fisher books, filmstrips.

a. Animals that have physical characteristics which they use in protecting themselves—claws, quills, stingers, horns, poisonous bites.

b. Animals that have natural camouflage for protection and thus are difficult for their predators to see— chameleon, many insects, fish, snowshoe rabbit.

c. Animals such as skunks that use a powerful odor for protection.

d. Animals that use sounds for protection.

4. Light and Dark

Animals respond to light and dark in various ways. Show pictures, films, filmstrips of:

a. Animals that move about when it is dark—bats, raccoons

b. Snakes, which see things in the dark that man cannot see

c. Animals that move about when it is light.

5. Temperature Responses

Animals respond to temperature in various ways. Show pictures, films, filmstrips or observe:

a. Dogs and other animals that pant to cool themselves

b. Pigs, which shunt their blood away from the skin's surface in cold temperatures but that are more susceptible to death in hot temperatures.

c. Bees, which cluster together in masses to keep warm in cold weather.

6. **Comparisons**

Compare an animal to a human being. How do they differ in relation tc movement, raising their young, physical characteristics (legs, fins, flippers, gills, etc.)?

7. **Comparisons of Animals**

Compare one animal to another or one group of animals to another group or category of animals.

a. Similarities

b. Differences

8. **Seasonal changes**

Animals adapt in various ways to seasonal changes. Show pictures, films, filmstrips of:

a. Animals that hibernate--fish, frogs, bears, snakes

b. Animals that migrate—birds, geese

c. Animals that acquire a heavier fur or covering

d. Animals that change color to provide a camouflage in the new season.

9. **Harmful Animals**

Discuss animals that are harmful to people. Show pictures, films, filmstrips of:

a. Dangerous animals, if they are threatened by man

b. Animals whose bites are poisonous—snakes, black widow spiders

c. Animals whose bites may cause disease—rabies.

10. **Animal Contributions**

Discuss animal contributions to man. Show pictures, films, filmstrips of:

a. Animals that provide food for man—cow, chicken, pig, turkey, deer, fish.

b. Animals that provide clothing or apparel for man—sheep; animals that provide furs; silkworms; animals that provide leather for making shoes, purses, wallets.

c. Animals that are friends or pets to man.

d. Animals that eat other animals that are harmful or a nuisance to man—snakes eat mice, cats eat mice, birds eat insects such as grasshoppers.

e. Animals that eat plants that are harmful or a nuisance to man—livestock eat mustard weed, which is harmful to man.

f. Animals that provide man with entertainment and recreation

1. Animals used for sporting purposes, as well as meat—deer, elk, fish, rabbit, pheasant, ducks, geese.

2. Zoo and circus animals, which are always enjoyable to observe

g. Animals that work for man:

1. *In some parts of the world, animals that provide transportation—horses, donkeys, camels, and dogs.*
2. *Dogs that help herd sheep and cattle.*
3. *Dogs that may be trained as Seeing Eye dogs for the blind.*
4. *Dogs that may be used in detective work, or serve as guards.*
5. *Cattle, mules, horses, which may do farm work.*

11. Animal Babies

Animal babies have different characteristics in relation to their parents. Show pictures, films, filmstrips or how babies:

a. *May or may not look like the parent.*
b. *Sometimes have identifying names*
c. *May eat different things or the same things as the parent.*
d. *May or may not move in the same way as the parent.*
e. *May or may not sound the same as the parent.*

12. Animal Movement

Discuss how animals move in various ways—some move only one way, and others move in several ways. Use visuals.

a. *Walk*
b. *Swim*
c. *Fly*
d. *Crawl*
e. *Have wings and do/do not use them for flying*
f. *Use a fin or tail for moving*

Children may imitate these movements. Play Hap Palmer's record **Sammy.**

13. Animal Changes.

Animals change when the seasons change. Place a live frog in water. Gradually add ice so the water temperature slowly lowers. The frog should become less active as its body temperature drops nearer to that of the water. When the frog becomes quite still, take it from the water and place it where it will warm up slowly. Observe what happens as the body temperature rises.

Variation: Place a grasshopper in a bottle, and put the cap on the bottle. Lower the bottle into ice water for some time. The insect should respond as the frog did to the lowered temperature.

14. Animal Food

Discuss and show visuals of what animals eat. At end of discussion, have child match pictures of animals with pictures of food.

a. *Plants*
b. *Insects*

c. *Nuts*

d. *Other animals*

e. *Garbage*

f. *Wood*

15. Physical Characteristics

Animals have various kinds of physical characteristics. Discuss and show pictures, films, filmstrips of:

a. *Various body parts that often serve important purposes.*

1. *Wings—How many?*
2. *Legs—how many?*
3. *Claws*
4. *Shell*
5. *Eyes*
6. *Tail*
7. *Mouth*
8. *Feet (study footprints)*
9. *Nose*
10. *Arms*
11. *Beak*
12. *Antennae*
13. *Lungs*
14. *Gills*
15. *Other?*

b. *Various body coverings that have characteristic textures and serve different kinds of purposes.*

1. *Fur*
2. *Skin*
3. *Feathers*
4. *Shell*
5. *Hair*
6. *Scales*

Eighth grade science books have excellent pictures. Also, **National Geographic Magazine** *and* **Ranger Rick Magazine.**

16. Extinct Animals

Some animals are extinct or no longer live on the earth. Show pictures, films, filmstrips of:

a. Dinosaurs

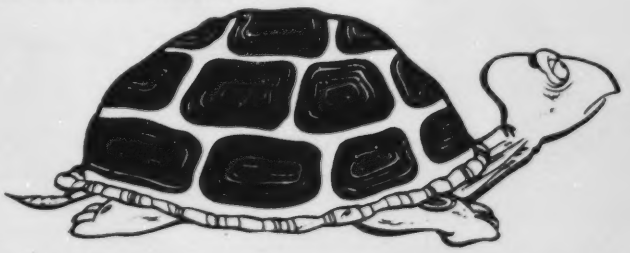
b. Mammoths

c. Saber-toothed tigers

Children are fascinated by extinct animals. This makes an exciting unit of study.

17. Animal Houses

Animals live in various places or environments, and in various kinds of homes. Show pictures, films, filmstrips of list below. After discussion, have children use matching boards of animals and their homes.



a. Trees

b. Desert

c. Jungle

d. Farm

e. Zoo

f. On the land

g. Underneath the ground

h. Near garbage

i. In cold climates

j. In water but not on the land

k. In water but also on land

l. Changes in habitat in particular seasons

18. Animal Sounds

Discuss and imitate animal sounds. Animals may make unusual sounds; the sounds may have a particular purpose.

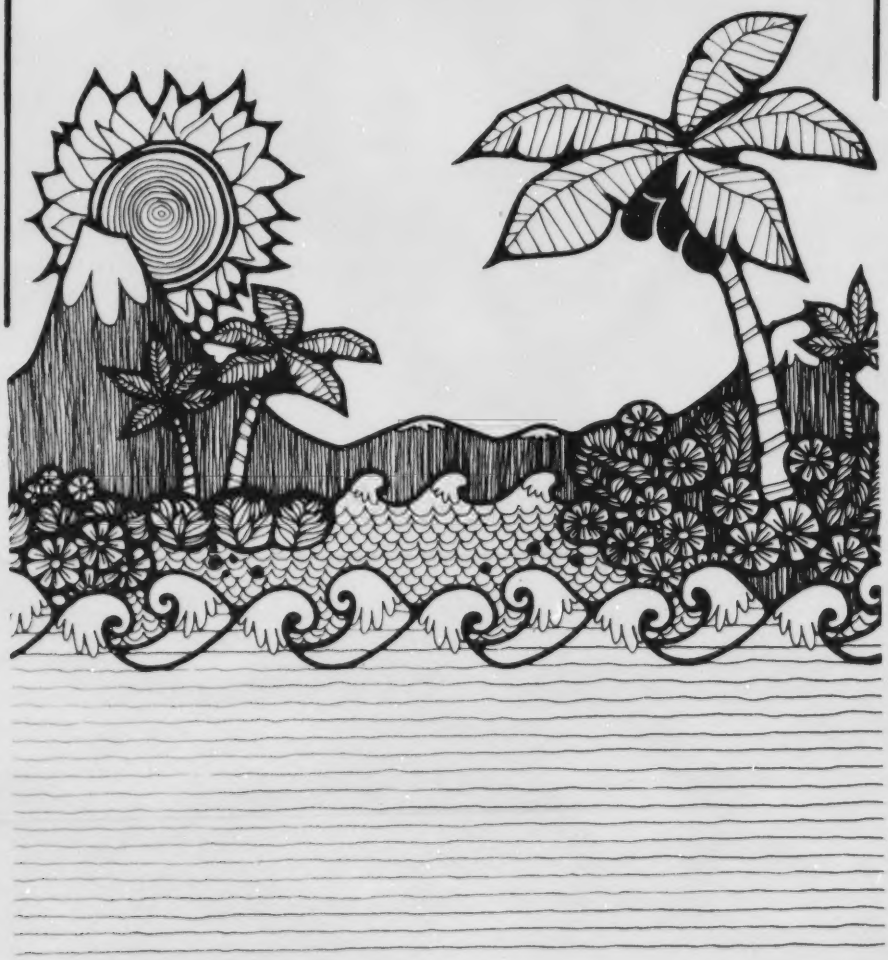
19. Caring for Animals

Before bringing an animal into the classroom prepare yourself and the children by reading and talking about the animal, its habits, and the natural conditions in which it thrives. Plan with the children for the care of the animal to protect it from harm and to keep it healthy and happy. When the animal is brought into the classroom, the children should be asked to observe such things as what the animal likes to eat, when and how it sleeps, how it moves, what it likes to do. Gerbils and hamsters are particularly popular for school classrooms. One drawback is that they tend to be nocturnal and sleep much of the time that children are present. Animals other than mammals might be considered. Lizards, poultry, and snakes are interesting to children. Remember: Check with your health standards about pets in the classroom.

20. Dinosaur Hunt

Bury small plastic models of dinosaurs in the sandbox. Using small paint brushes, have the children pretend to be on an archaeological dig for prehistoric animals. This can also be done inside using the water tub or plastic pan filled with sand.

PLANT POWER



IV. PLANT POWER

A. Fingerplays, Songs, Poems

FOUR LITTLE APPLES

Four little apples dancing on a tree,
They danced so long they set themselves free.
They continued to dance as they fell to the ground.
And there by some children the apples were found.

"Oh, Look at the red one, it almost bounced."
"I'll take the rosy one," another announced.
The third child laughed as he chose the yellow one,
"I'll take it to mother, 'cuz she lets me have fun."
The fourth child put the last on the tray.
And carefully carried the green apple away.

TWO BIG ORANGES

Two big oranges hanging on a tree;
(hold up two fingers)
Two big oranges smiling at me.
(show big smile)
I shook that tree as hard as I could
(shake yourself all over)
Down came the oranges, Mmmmmmmmmmmm! Were they good!
(down on knees, rub tummy, jump up)

RAIN

Pitter, pitter pat, Gentle rain drops tap,
Rain is falling down, rain is falling down.

LITTLE SEED

"Sleep, sleep, sleep little Seed
Hidden so far away."
"Wake, wake, wake up and grow,
Wake up and grow today."

SEEDS

I'll dig, dig, dig,
And I'll rake some leaves
I'll hoe, hoe, hoe
And I'll plant some seeds.
I'll wait and watch
And soon right there
My seeds will sprout
if given care.

POPCORN

Pop, pop, pop, say the popcorn in the pan
Pop, pop, pop, try to catch me if you can.
I'm a dancing little fellow
Pop, pop, pop, I cook all white puffed and yellow...
pop, pop, pop, pop

THE APPLE

Up in the apple tree
High off the ground,
I see an apple so big and round.
I climb up the tree and hold on tight,
I pick that apple and take a bite.
Mmmm! Good!

THE LITTLE PLANT

In the heart of a seed planted deep!
A dear little plant lay fast asleep
"Awake," Said the sunshine, "and creep to the light,"
"Awake," Said the voice of the raindrops bright,
The little plant heard and it arose to see,
what the wonderful world outside might be.

MY GARDEN

This is the way I plant my garden
digging, digging in the ground.
The sun shines warm and bright above it.
(form circle with arms)
Gently the rain comes falling down
(let fingers flutter)
This is the way the small seeds open
(let closed fist open)
Slowly the shoots begin to grow.
There are my pretty garden flowers
Standing, standing in a row,
(hold up all ten fingers).

LITTLE FLOWERS

Little flowers swaying in the breeze,
Turning our faces up to sun and trees.
When the night comes, each one
Nods and sleeps.

THE WEED AND THE FLOWER

In a tiny hole, not very deep,
Two tiny seeds lay fast asleep.
Every day they grew and grew
'Til Weed was green and Flower blue.
Weed stretched a bit, and looked around
He spotted Flower, and frowned a frown.
"I need this space, you'll have to go!"
Flower to Weed, "Please don't fuss,
There's plenty of room for both of us."
But Weed was big, and Weed was gruff
"The whole garden is not enough!"
Then along came Boy and saw the need
He leaned low, and pulled the Weed.

MY GARDEN

I dig, dig, dig, I plant some seeds.
I rake, rake, rake; I have some weeds.
I wait and watch, and soon right there
My garden sprouts—with lots of care.

SLEEPING FLOWER

This is the way the flowers sleep,
under the soft white snow.
This is the way when spring-time comes
flowers wake and grow.

WAY UP IN THE APPLE TREE

Way up in the apple tree,
two little apples smiled at me.
I shook that tree as
hard as I could.
Down fell the apples—
M m-m-m-m-m-m they were good.

SPRING FLOWERS

I plant a seed deep underground
The sun shines bright,
then comes a shower
The seed wakes up and lifts its head
To grow into a lovely flower.

WHO HELPS?

Who helps the seeds grow?
"I" said the sun
"I warm them every one."

Who helps the seeds grow?
"I" the rain said
"I wash them in their bed."

Who helps the seeds grow?
"I" said the ground
"I keep them safe and sound."

Who helps the seeds grow?
"I" said little Nell
"I wish them well".

LEAVES

The leaves are dropping from the trees,
(flutter fingers up in air and to ground)
Yellow, brown, and red.
They patter softly like the rain;
(Tap fingers on floor)
One landed on my head.
(tap head)

LITTLE FLOWERS

The sun comes out and shines so bright
(Hold both hands over head)
Then we have a shower
(Shake both hands)
The little bud pushes with all its might
(Clinch fists together and jiggle hands)
And soon we have a flower.
(Open up hands, slightly apart)

AUTUMN WOODS

I like the woods in autumn
when dry leaves hide the ground.
When the trees are bare
and the wind sweeps by
With a rushing sound.

I can rustle the leaves
in autumn
I can make a bed
in the thick dry leaves
That have fallen
from the bare trees overhead.

B. Learning Activities

1. Inside a Seed.

Soak large beans in water overnight. Have children open the seeds the following day. (Open at the scar.) Children should predict what they will find inside the seed. The use of magnifying glasses can increase the children's ability to see details of the seed.

2. Sprouting Seeds.

Wet a paper towel. Using a clear plastic cup, wrap the paper towel along the inside of the cup. Fill the cup with sand. Place popcorn kernels between the plastic cup and wet paper towel. Label each child's cup and set along the science table, on top of his/her locker, etc. Keep the sand moist. Within 3 days the kernels should sprout.

3. Plants Need Water.

Place 2 potted plants in a window. Water one daily but do not water the other one. Note daily changes between the two plants.

4. How Plants Drink.

Wash a stalk of celery under water; trim the end off and cut it up the center. Cut it almost the entire length of the stem but not quite all the way. Fill two glasses with water and put different colors of food coloring in each one (red and blue work well). Put half of the celery in one glass of colored water and the other half in the other glass of colored water. Within hours the veins going up the stem of the celery and the leaves on the top of the stalk will change color corresponding to the colored water in the glasses. One could also put a white carnation in the colored water, and the petals will change color.

5. Plant Sizes.

Compare sizes of plants, such as a radish plant and a tree, or one kind of bean plant and another.

6. Plant Parts.

Put different plants or parts of plants in a paper bag. Have a child describe one of the items, and ask the other children to guess the name or part of the plant from the description given.

7. Age of a Tree.

Obtain a tree stump that is fairly old and demonstrate to the children how to count the rings to learn the age of the tree.

8. Plant Sorting.

Put plant pictures on cards and have the children sort the plants into categories. Categories might include the following:

a. *Plants that we eat/plants that we do not eat*
b. *Fruits/vegetables/trees/foliage/flowers*
c. *Plants that grow above the ground/plants that grow below the ground/plants that grow in water.*

9. **Plants Needs.**

Obtain five similar plants such as bean plants or flowers. Give one plant all the necessary ingredients except air; another, everything except light (put it in a dark room or closet); another, everything except water; another, everything except soil (food). Provide all the necessary ingredients to the fifth plant. Observe how long each plant grows and lives.

10. **Plant a Terrarium.**

Plant and care for a terrarium (class or individual). Use an empty aquarium, large jar or bowl. Put fine gravel on the bottom, then add good soil, a layer of vermiculite, some sand, and a little charcoal. Add plants, then sprinkle with water. Cover. The children can observe the plants absorbing moisture, the moisture evaporating from the ground, and the moisture condensing on top of the jar.

11. **Sprouting Seeds.**

Sprinkle grass seeds on a wet sponge and watch their growth. Sponge may be cut into shapes. Ex: Shamrock for St. Patrick's day, heart for Valentine's Day, numerals, etc. Keep sponge moist. Scooped out potato works also.

12. **Plants Need Sun.**

Put a plant near the sun and leave it in the exact position for several days. Observe how it "follows the sun."

13. **Direction a Plant Grows.**

For the children to learn the concept that stems grow upward and roots grow downward, obtain a clear glass or plastic jar and secure a piece of fine gauze over the top with an elastic band or a string. On top of the gauze, sprinkle seeds such as wheat kernels, and then fill the container with water. Make sure that for the first few days the container is watered to the top, and that the seeds remain wet enough to sprout. Be sure to put the container in a dish or pie plate, since the gauze absorbs the water. Within a few days the seeds will sprout—the roots growing downward, and the stems growing upward.

14. **Things Trees Give Us.**

Hollow out a tree stump, or simulate a stump using a bucket wrapped in paper made to look like bark, and put products of trees on the inside. The children will be fascinated to learn that many products—paper, boards, gum, drugs, paint, dyes, waxes—are obtained from trees.

15. **Plant a Garden.**

Plant and care for a garden (indoor or outdoor). The actual procedure will vary depending on climatic conditions. In warmer areas where planting can begin in late April or early May, garden spots can be tilled and lettuce and spinach planted in time for eating before school is out. Tomato seeds can be started inside in March or April and then transplanted to the outside garden in May. Flowers can be planted in early spring. If someone can care for the plants over the summer, the tomatoes, zinnias and sunflowers should be at their peaks when the children return to school in the fall.

NOTE: Even young children should be given real garden tools.

16. **Growing Bulbs.**

Study and observe plants that do not grow from seeds—plants that grow from bulbs, and plants that grow in particular circumstances such as moss and mold. Allow the children to look at the plants through a magnifying glass.

17. **Decorate the Classroom.**

Have several kinds of potted plants including coleus, begonia, spider, and Swedish ivy. Keep these plants in the classroom during the year. Encourage children to care for these, including watering, feeding, trimming, and repotting when necessary. These plants can be the source of clippings for the children's experiments or for plants to take home as gifts, but their primary function is to make the classroom an attractive place to be and to involve children in its care.

18. **Tasting Party.**

Have a tasting experience in which the children taste different parts of plants. Ask children to name and give examples of edible parts of plants.

19. **Pig Planter.**

Dig out center of medium sized potato. (This hole will be filled with potting soil later.) Turn the potato over and insert four golf tees in the four corners of the potato. (These will serve as legs.) Place three thumbtacks in one end of the potato (eyes and nose), and in the other end, place a curled pipe cleaner (tail). Now fill the hole with potting soil and plant rye grass, lettuce or any herbs.

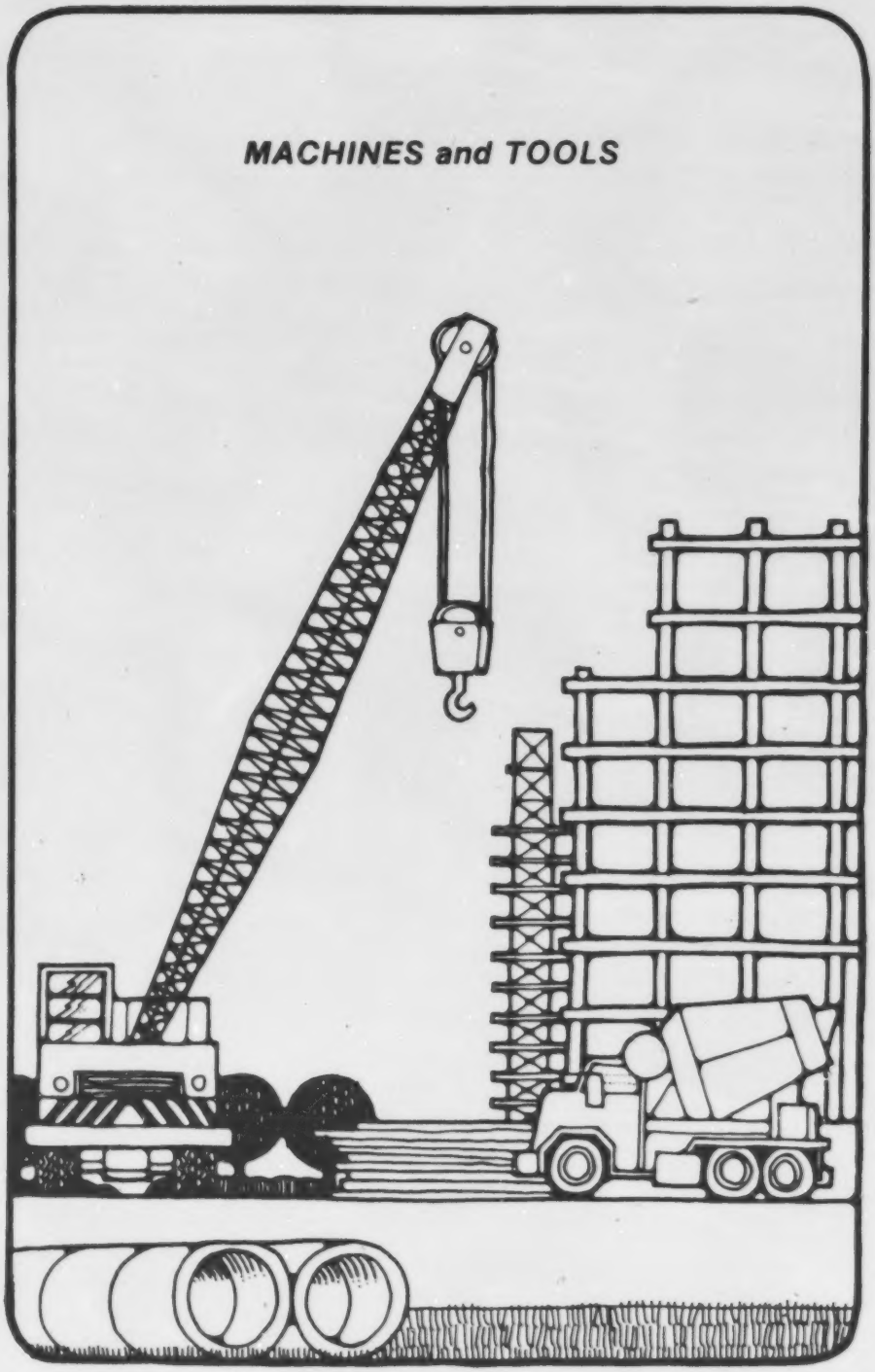
NOTE: Thumbtacks are dangerous with very young children. Consider using golf tees instead of tacks.

20. **Do Plants and Seeds Need Soil?**

Plant one seed in a pan with soil in it. Place another seed in a jar filled with stones. Water both the seed in the pan and the one in the jar. Observe what happens.

21. **Do All Plants Grow From Seeds?**

Place a sweet potato in a jar of water. Place a carrot top with leaves removed in a dish of water. Place an onion in a jar of water. Place flower cuttings in a glass of water. New plants will grow.


MACHINES and TOOLS

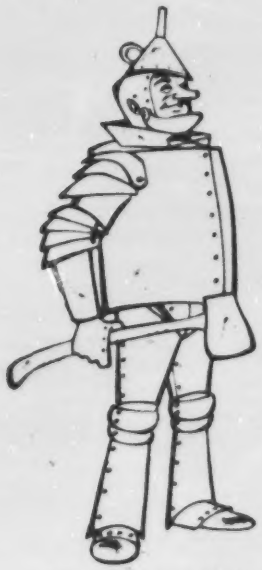
V. MACHINES AND TOOLS

A. Fingerplays

FOUR MACHINES

One machine,
(hold up fingers as each number is spoken)
Two machines,
Three machines,
Four
They work and work and work and work.
And then they work some more.

(Use a variety of "work" motions, such as hammering with fists, pulling, clasping, or tugging with hands and arms or moving hands in circular patterns around one another when reciting the last two lines.)



MOVING MACHINES

Some machines go up and down,
(move hands up and down)
Some machines go round and round,
(move hands round and round)
This machine is ready to go,
(clasp hands in front of body)
See it moving to and fro.
(move hands back and forth in a sawing motion)

MACHINES WORK FOR US

Machines work for us,
Buzz! Chug! Whirr! Bang!
Moving 'round without much fuss.
Pop! Pow! Vroom! Clang!
Some push, pull and lug,
Others lift, toss, and tug!
Machines are a definite plus,
Working everyday for us!

(Encourage children to imitate other sounds they have heard machines produce.)

"GRANDPA BUILDS A TABLE"

Children imitate actions of tools called for in a Hap Palmer song.

AUTO, AUTO MAY I HAVE A RIDE?

Auto, auto may I have a ride?
Yes sir, yes sir, step right inside.
Pour in the water, turn on the gasoline,
And chug, chug, away we go.

THE AEROPLANE

The aeroplane has great big wings,
And a propeller that goes round and
Sings - - - - B R R R R R R R R R R R
It goes up, up, up, up.
And down, down, down, down.

B'S THE BUS

B's the bus
The bouncing Bus,
That bears a shopper store-ward
It's fun to sit
In back of it
But seats are better forward.
Although it's big as buildings are
And looks both bold and grand,
It has to stop obligingly
If you but raise your hand.

WAGONS

This red wagon belongs to you.
Here is a blue one. Now there are _____ .
(Children supply number)
This yellow wagon now makes _____ .
It belongs to Daddy and me.

This green wagon came from the store,
Count them all, one, two, three, _____ .

Here are a purple one and an orange one, see?
Here is a brown one; count them with me.

One, two, three, four, five, six, seven.
If I had four more I'd have eleven.

THE CLOCK

Tick, tock, tick, tock,
Merrily sings the clock;
It's time for work,
It's time for play,
So it sings throughout the day.
Tick, tock, tick, tock,
Merrily sings the clock.

B. Learning Activities

1. Machine Collage

The children glue a variety of nuts, bolts, cams, and cogs onto large pieces of cardboard. When the glue has dried, spray paint with enamel (silver or gold will achieve a stunning effect).

2. Robots

Combine empty spools of thread, discarded cardboard toilet tissue and paper towel holders, coils of wire, nuts and bolts and adding machine spools to manufacture miniature robots. Again the gold or silver spray enamel seems appropriate when the gluing process is complete.

3. Machine Mobiles

Hang old bicycle wheels from the ceiling in a horizontal position. Ask children to bring in toy cars or trucks to fasten onto the spokes. Or give the children a few patterns which resemble machine shapes. Allow them to trace and cut out the patterns. Then string the results onto the tires. Another thought is to suspend machine parts that are dismantled from old machines.

4. Machines Center

Collect discarded equipment which is consumable and can be taken apart. Old radios, clocks, and record players are ideal for this venture. Recover unused cameras, movie projectors, or other abandoned machinery from parents. (Do not use television sets that are inoperable. They store electricity and are potentially dangerous to persons who are not skilled electricians.) If the teacher feels incompetent to take machines apart, a parent, or the custodian, may be invited to supervise the activity with children.

5. Box Structure

Cereal boxes can be decorated with egg cartons, ice cream sticks, beans, macaroni, small cans, and numerous other materials to resemble machines.

6. Special Activities

Plan for visitors to come to the classroom. A carpenter or plumber can be invited into the classroom to tell about and demonstrate the work they do. Or ask the school custodian for his participation. A field trip to a local building site, factory or business (Ex: bakery, greenhouse, upholstery shop) will be a long-remembered occasion. The teacher will want to take a series of slide pictures of machines found in the community and present these to the children for discussion.

7. Listening Center

Tapes for the listening center will need to be made by the teacher. A tape about machine sounds in the home can originate while the tacher vacuums the living room, uses the hair dryer, runs the dishwasher, electric mixer, can opener, or sewing machine. Another tape can be composed of machine sounds heard in the city, such as those made by trains, bulldozers, sirens, car horns and garbage trucks. The possibilities are endless.

8. **Matching Game**

Supply the children with many different types of tools. The children classify tools or machines according to use by sorting these into work kits. Examples: kitchen tools (egg beater, grater, potato masher), garden tools, carpenter tools, mechanics tools, school tools.

9. **Inclined Plane**

Make an inclined plane with blocks. Roll a ball down it. Will the ball roll by itself if you let it go? Will it roll by itself if you put it on a table? Do the same thing with other objects. Make a large inclined plane from a plank. The children will enjoy pushing something heavy up it. Let the children try to pick up the heavy object. Which way is it the easiest?

10. **Picture Board**

Display the six simple machines (1. lever, 2. wheel and axle, 3. pulley, 4. inclined plane, 5. wedge, and 6. screw). Have several pictures of everyday objects that can be classified into the six simple machines. The child will observe the machine and select all the pictures that show the machine in use. Example: car—wheel and axle; see-saw—lever; flag pole—pulley; stairway—inclined plane; screw-on bottle tops—screw; and knife—wedge.

11. **Using a Pulley**

Attach a pulley to a frame. Thread a heavy string through it. Let the children try to lift objects by hand and then by the pulley. Which is easiest?

Variation: Attach the pulley string to a metal pail or bucket. Attach another string to a matching pail but not to a pulley. Ask the children to lift both pails. Which is easier? Why? Pails may be filled and weighed so children can relate to pounds being lifted.

12. **Friction — Sliding**

Friction slows sliding objects. Give the children rubber erasers and a piece of waxed paper. Rub the piece of waxed paper on your arm. Does it slide easily? Rub the eraser on your arm. Does it slide easily?

Variation: Place an inclined plane block on the floor. Have a child with rubber soled shoes step on it and try to slide down. Remove one shoe and repeat. What happens to the foot with the sock only?

13. **Friction — Heat**

Friction makes heat. Rub hands together vigorously. How do they feel? Give a child a piece of sandpaper and a block of wood. Rub the wood with the sandpaper. Feel the wood. Is it warm? Is it smoother? Does friction wear things away?

14. **Friction — Uses**

Friction can be useful. Give the child a small screw top jar that is easy to open. Let him/her unscrew it and then screw back the top. Then wet the child's hands with soapy water. Let him/her try again. Is it harder to do this time? Do we need friction to hold the top?

Variation: Write on the chalkboard with a piece of chalk. Dip the chalk into vaseline or oil. Now write with the chalk. We need friction to write, color or chalk.

15. Woodworking

Encourage children to use the woodworking center. They will find out use of the simple tools. Guidance from the teacher should include calling children's attention to the tools and the uses of the tools. Hammers, saws, pliers, hand drills screwdrivers, screws, nuts, bolts, and vises provide firsthand experience for children who want to construct, saw, pound, or tear down.

NOTE: Introduce the tools gradually. Also provide safety glasses to use when working in the woodworking center.

16. Classify Machines

Ask the children to use new vocabulary words (such as start, stop, move, power, motor, energy, and muscles). Help them identify and list machines into basic classifications: (1) machines that are found in the home, (2) machines that help in the preparation of food, (3) machines that run with electricity, (4) machines that help build, (5) machines that need money before they can operate, or (6) machines that need special operators. Have pictures, slides or actual machine and discuss with the children.

17. "Pull the Plug"

While the children are pretending to be machines, instruct them to "go" when the machine is plugged in; they must stop immediately when the teacher indicates "pull the plug."

18. Wheels

Include a large varietyof wheeled toys in the block area, on the playground, and in areas where there is space to run wheeled toys without disturbing other activities. Encourage free exploration and help children verbalize what they observe. For example, a child has a tricycle upside down and is turning the front wheel by moving the pedals by hand. You might comment with mock surprise: "The rear wheels are not turning!" or you might ask questions such as "What's happening to the front wheels when you do that?"

19. Clothesline Pulley

Encourage children to hang up their own paintings on the clothesline using clothespins. Two pulleys are attached to opposite walls of a room, one end high on the wall, and the other end low enough to be easily reached by children. Children can attach the paintings to the low end and then move the rope to send their painting to the high end. The rope goes around the pulleys at each end.

20. Lifting Loads

Attach a large pulley to a tree branch. Thread rope through the pulley and attach to one end. (The rope should be twice the length from the low tree branch to the ground.) Leave the other end of the rope free but knotted so it can be held easily. Children can fill buckets with sand or dirt and then lift them up by pushing the pulley.

FORCE and PRESSURE

VI. FORCE AND PRESSURE

1. **Water Pressure** (outside)

   A garden hose with a nozzle can be made available to the children outside in warm weather. The children should look at the nozzle to see how it is constructed and notice how it changes the force with which water comes out of the hose.

2. **Water Pressure** (inside)

   Punch a vertical line of holes about one inch apart from the bottom of a tin can nearly to the top. This can be used at the water table or use a faucet to fill the can. Children will notice that the water stream from the bottom hole is the longest, while the water stream from the top hole is the shortest. If no water table or faucet and sink are available in the classroom, the tin can be filled by being dipped into a bucket or pan of water.

3. **Sink and Float**

   Provide a container of objects that will sink or float in a water table, water tub, or dishpan. The child selects an object from the container, and places it in the water to see if it sinks or floats. The child then places the object into the proper container labeled with pictures showing something floating and something sinking. Younger children will be content to sort objects into sink or float containers rather than seeking reasons for floating or sinking.

   NOTE: A large terrycloth towel and mop should be readily available. Also, the children need to wear aprons for this activity.

4. **Water Level**

   Fill two clear-glass containers with water and mark the water level. Leave the lid on one of the containers; leave the other container uncovered. Each day observe and mark with a crayon or rubberband the water level in the uncovered bottle. Frequently compare the current water levels in both containers. Include the word "evaporation" often in the discussion.

5. **Freezing Water**

   Fill a large glass or plastic container **partially** *full of water and mark the water level with a crayon or rubberband. Put the container in the freezer, or outside if the temperature is below freezing. After the water freezes, determine whether the ice line is above or below the water line. Mark the ice line. The children should discover that when water freezes, it expands. Allow the container of ice to melt back into a liquid. Compare ice and water lines.*

6. **Water Solutions**

   Allow children to experiment with substances that dissolve in water and substances that do not dissolve in water. Compare sand, salt, marbles, an antacid tablet, flour, soda, sugar, gelatin, powdered drink, etc.

7. **Water Uses**

Water has many uses. Discuss, using visuals, the following concepts:

a. **Man**—*drinking for survival; washing and cleansing of self, clothes, home, food; watering crops, gardens, grass, etc.; cooking; ice for preserving foods; steam for cleaning, and ironing or pressing.*

a. **Animals**—*survival, homes*

c. **Plants**—*survival, homes*

8. **Air Experiment**

Turn an empty glass upside down and force it **straight down** *into the bowl of water or water table. The glass will not fill up with water.* **Tilt** *the glass to one side. There are bubbles that rise and break at the water's surface. These bubbles show that the glass was full of air.*

Variations: Take a napkin and crumple it up. Place it in the bottom of a clean, dry glass. Force the glass **straight down** *into the bowl of water and then lift it straight out again. The napkin will be dry. Force the glass straight down into the water and then* **tilt** *the glass to one side. Water enters the glass and wets the napkin. Air takes up space even though we cannot see it or taste it.*

9. **Air Pressure**

Bend flexible plastic tubing into a U-shape and fill it midway with water. Partially close one end of the tube with your thumb and tilt the tube until the water rises to your thumb. Then, seal the end completely with your thumb and return the tube to the vertical position. The water will stay raised in the side of the tube closed by your thumb. Why? Your thumb prevents air from entering the sealed end of the tube, but air can press down on the water through the open end. The air pressure forces the water up against your thumb.

10. **Gravity**

Give each child an object and have him drop it. Repeat this several times. Each time the child drops the object, ask a question such as "Will it fall to the ground this time?" "Will it fall up?" "Will it fall to the side?" "What will happen everytime you drop it?" There is a force which pulls everything downward to the center of the earth. This force is called gravity.

NOTE: Young children will have difficulty understanding or explaining gravity. It is sufficient to focus on recognizing that objects will fall to the ground every time and that this is predictable.

11. **Magnetism**

Children enjoy using magnets. Activities might include.

a. **Magnetic fishing game**—*use horseshoe magnet on fishing pole to attract paper fish with paper clip nose.*

b. **Paper clip sailboat**—*cut a piece of paper the size of a small triangle. Attach it to a paper clip. Place the boat on a glass surface and use a magnet underneath to make the boat move.*

c. **Boat**—*place a tiny boat with a steel pin on a non-magnetic dish filled with water. Move the boat without touching it, with a magnet.*

d. **Flying Clip**—*tie a paper clip to one end of a string 12" long. Tape one end to the table. Make the clip rise by holding the magnet near it. You can observe the effect of the magnet but cannot see the magnetic field. Pass your hand between the clip and the magnet. What happens? Pass a piece of paper between the clip and the magnet. What happens?*

12. Helicopter

Cut a piece of typing paper about 2" by 5". Draw a line across the middle and another line down from the top to divide just the **top** *half. Cut down the vertical line until you meet the line going across. Fold the two wings in opposite directions. Attach a paper clip to the bottom of the helicopter. Throw it into the air. It will spin and spiral to the ground.*

13. Ice Column

Fill a narrow neck soft drink bottle with water. Stand the bottle, uncapped, in the freezer. When the water has frozen, a column of ice will stick out of the top. Why? Since water expands when it freezes, the ice takes up more space than the water did before it froze. This is the reason water pipes sometimes burst in wintertime. When water freezes in a closed pipe, the ice that forms needs more room and presses against the pipe until the pipe splits.

14. Air Pushes

Demonstrate that wind is air in motion by fanning air with a piece of cardboard. Make and play with wind toys such as pinwheels and accordion-pleated fans. Give each child a sheet of newspaper. Have child place it against his/her body and run as fast as possible. What holds the paper up?

15. Air Sounds

Clap hands with palms open and flat. Listen to the sound. Then cup hands and clap. Does it sound differently? Air is caught between the hands to change the sound.

16. Air Space

Show the children an empty tin can. Is anything in it? Punch a hole in the bottom with a hammer and nail. Insert the can and slowly push it into the water. Have a child hold his/her hand over the nail hole to feel the air escape. Was the can empty?

17. Water Level

Color the water in a water table with food dye. Insert a funnel into a two or three foot length of plastic tubing. Hold the funnel and end of the tubing upright. Another child can pour the water from the water table into the funnel. The level of the water will be the same in both ends of the tubing. The same pressure pushes on both ends so the depth of the water is the same.

18. Condensation

Fill an empty tin can with ice cubes. Add a few drops of food coloring. Let stand awhile. Water will form on the outside of the can. The water outside the can is not colored. Did the water leak through the can? Where did it come from? Out of the air?

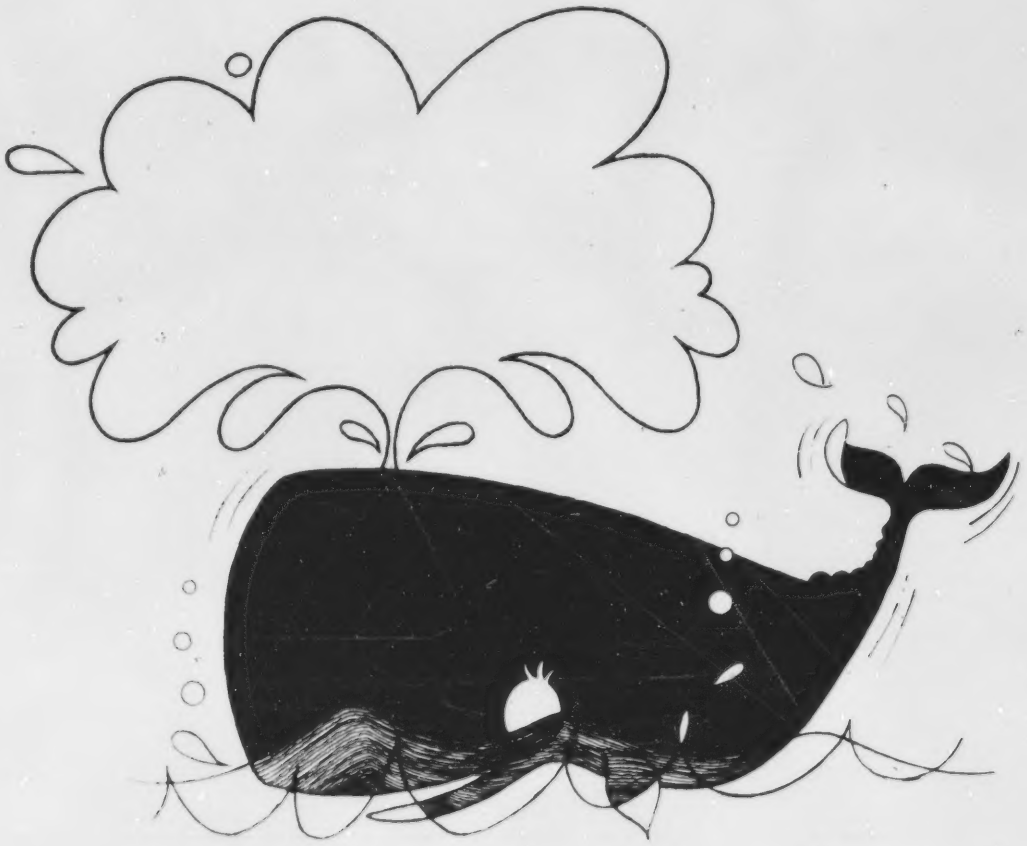
19. Magnet Box

Set out a large assortment of objects. Supply different sizes of magnets. Let the children experiment and sort the objects into two boxes labeled "Yes" and "No." The yes box is for magnetic items and the no box for non-magnetic items.

20. Pumps

Provide various types of pumps, such as: hypodermic and bulb syringes, spray bottles, and pump-type hand lotion. Encourage children to explore freely with these kinds of pumps. As they work at the water table, ask questions which will further children's thinking. For example, as a child pushes the plunger down on a hypodermic syringe with the tip held under water, ask, "Do you see what's happening?" (Bubbles.) "What are those bubbles?" A child who doesn't know can be asked to hold an empty syringe with the tip about an inch above one arm and to push the plunger down. What does the child feel?

NOTE: These items are good for outdoor water play. When they are used inside, children will need to be reminded to point the water toward the tub.



APPENDIXES

APPENDIX A

Suggested Science Resources

Records

Bell Records
Columbia Picture Industries, Inc.
1776 Broadway
New York, NY

Bowmar Records, Inc.
622 Rodier Drive
Glendale, California 91201

Children's Record Guild
27 Thompson Street
New York, NY 10013

Folkways Records and Service Corp.
165 W. 46th Street
New York, NY 10036

Hap Palmer Record Library
Educational Activities, Inc.
Box 392
Freeport, NY 11520

Schmitt Music Center, Inc.
Minneapolis, Minn.

Small World Records
761 Two Gateway Center
Pittsburgh, PA 15222

Walt Disney Productions
Burbank, California

Young People's Records, Inc.
100 Fifth Avenue
New York, NY 10013

Pictures

Children's World
Elgin, Ill. 60120

David C. Cook
Elgin, Ill. 60120

Society for Visual Education, Inc. (SVE)
Chicago, Ill. 60614

Films and Filmstrips

David C. Cook
Elgin, Ill. 60120

Churchill Films
662 N. Robertson Blvd.
Los Angeles, California 90069

Connecticut Films, Inc.
6 Cobble Hill Road
Westpoint, Conn. 96880

Coronet Instructional Films
65 S. Water Street E.
Chicago, Ill. 60611

McGraw-Hill Films
Bank Street College of Education
330 W. 42nd Street
New York, NY 10036

Pyramid Films
Box 1048
Santa Monica, California

Three Prong Television Productions
1525 East 53nd Street
Chicago, Ill.

Weston Woods Studios, Inc.
Weston, Conn. 96880

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APPENDIX B

Discovery Center

A quiet center should be planned where discoveries and exploration of materials can be made by individuals and small groups of children. The center should be furnished with shelves, a variety of containers, small tables and comfortable chairs.

Suggested **discovery aids** to be included in the Discovery Center:

- animal cages
- aquarium
- binoculars
- clock
- compass
- flashlight
- globe
- machines (pulley, wedge, screws, levers, springs, wheels)
- magnets (horseshoe and bar)
- magnifying glasses (tripod and hand)
- microscope
- mirrors
- prisms
- rubber tubing
- stethoscope
- telephone
- telescope
- terrarium
- tuning fork

Suggested **specimens** to be on display in the Discovery Center:

- animals
- bird nests
- butterflies
- coconut shells
- cotton
- driftwood
- feathers
- flowers
- fur
- insects
- leather
- leaves
- moths
- plants
- rocks
- seashells
- seeds
- sponges
- thermometer

NOTE: The science table should be changed frequently to offer varied learning activities. Display materials the children bring from home, find on the playground, or pick up on nature walks. Use the science table to reflect the theme of the day, week, or month.

APPENDIX C

Free or Inexpensive Science Materials

Many associations and organizations will send you free or inexpensive printed materials, such as pamphlets, brochures, booklets, and charts. To find out about the availability of such materials, simply prepare letters on your school stationery requesting copies of free materials or lists of inexpensive materials that are available. A list of associations and organizations you may wish to contact is shown.

American Association for Health,
Physical Education, and Recreation
1202 16th Street, N.W.
Washington, D.C. 20036

American Fisheries Society
1040 Washington Building
Washington, D.C. 20005

American Forest Products
Industries, Inc.
1835 K Street, N.W.
Washington, D.C. 20006

American Forestry Association
919 Seventeenth Street, N.W.
Washington, D.C. 20006

Animal Welfare Institute
P. O. Box 3492
Grand Central Station
New York, New York 10017

Arizona Game and Fish Department
1688 W. Adams Street
Phoenix, Arizona 85007

Bureau of Indian Affairs
U.S. Department of Interior
Washington, D.C. 20242

Conservation Foundation
1250 Connecticut Avenue, N.W.
Washington, D.C. 20036

Environmental Defense Fund
P.O. Drawer 740 Stony Brook
New York, New York 11790

Fish and Wildlife Service
U.S. Department of Interior
Washington, D.C. 20242

Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
U.S. Department of Interior
Short Course Building
Rutgers State University
New Brunswick, N.J. 08901

Friends of the Earth
30 East 42nd Street
New York, New York 10017

Georgia Game and Fish Commission
Education and Information Division
401 State Capital Building
Atlanta, Georgia 30334

Information Office U.S. Department of Agriculture
Washington, D.C. 20250

Izaak Walton League
1326 Waukegan Road
Glenview, Illinois 60025

National Audubon Society
1130 Fifth Avenue
New York, New York 10028

National Geographic Society
17th and M Streets, N.W.
Washington, D.C. 20036

National Parks Association
Washington, D.C. 20009

National Wildlife Federation
1412 Sixteenth Street, N.W.
Washington, D.C. 20036

Sierra Club
1050 Mills Tower
San Francisco, California 94104

State Conservationist of the
Soil Conservation Service
U.S. Department of Agriculture
Washington, D.C. 20250

State Department of Conservation
Conservation Education
1516 9th Street
Sacramento, California 95814

The Wilderness Society
729 Fifteenth Street, N.W.
Washington, D.C. 20005

Tuberculosis and Respiratory Disease
Association
National Headquarters
1740 Broadway
New York, New York 10019

U.S. Chamber of Commerce
National Resources Department
1614 H Street
Washington, D.C. 20006

SOURCE: Abruscato, Joe and Hassard, Jack. *Loving and Beyond.* Pacific Palisades, California: Goodyear Publishing Co., Inc., 1976, p. 39.

APPENDIX D

Suggestions for Teaching Science Activities

1. Plan an area for science activities. This might be called the "Science Table" or "Discovery Center."
2. Display materials which will encourage experimentation.
3. Give children plenty of opportunity to explore and experiment on their own.
4. All equipment and materials needed for an activity should be on hand and ready to use.
5. Try the experiment before presenting it to the children. Know the outcome and that it will be observable within a short period.
6. Do not give answers too readily. Let the child do the discovering. Ask questions which will stimulate thinking.
7. Ask questions which will direct the child's attention to something that may have been overlooked.
8. If the child is unable to complete an experiment, a clue should be given. A good approach is to give clues by saying, "I wonder what would happen if. .?" or "Why do you suppose. .?"
9. Children should never be made to feel that they have failed in a science activity. Every child should feel they have done something right and learned something of value in science.
10. All the children should not be expected to carry out all of the activities at the same time.
11. Adapt the activity to meet any special needs of the group of children.
12. Include provisions for safety standards.
13. Try to overcome any personal fears of certain animals or areas of science.

NOTE: Elaborate equipment is not necessary. Observe the environment: sky, earth, shadows, water. Many activities can be done with a magnifying glass, ruler and a measuring cup.

APPENDIX E

Activity Plan

NAME _____ DATE _____

Name of the Activity _____

1. Goals for the Activity _____

2. Learnings from the Activity _____

3. Equipment and Materials Needed: _____

4. Procedure Steps: _____

5. Guidance Suggestions:

   a. How to involve children:

b. Questions children might ask:

c. Ideas for special needs children:

6. Safety Precautions:

7. Evaluation and suggestions for future use:

8. Follow-up Activities:

9. Clean-up:

APPENDIX F
Science Presentation

INSTRUCTOR CHECKLIST:

ACTIVITY	RATING *	
	Acceptable	Unacceptable
1. Chose an activity appropriate for the group		
2. Chose appropriate equipment		
3. Arranged equipment in orderly manner		
4. Prepared materials		
5. Chose appropriate materials		
6. Arranged materials in orderly manner		
7. Distributed supplies		
8. Gave oral directions that were understandable		
9. Encouraged individual participation		
10. Encouraged group participation		
11. Provided individual attention		

* All applicable items must be rated acceptable

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INSTRUCTOR CHECKLIST:

ACTIVITY	RATING *	
	Acceptable	Unacceptable
12. Provided for children with special needs		
13. Practiced and explained safety procedures		
14. Encouraged children to ask questions		
15. Encouraged children to be observant		
16. Encouraged children to assume responsibilities		
17. Praised individual achievements		
18. Encouraged children to verbalize what they had seen and done		
19. Practiced positive guidance techniques		
20. Guided children in cleanup		
21. Objectively completed self evaluation		

* All applicable items must be rated acceptable

SOURCE: VTECS catalog, *Child Care Worker*, 1975, pp. 72-73.

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